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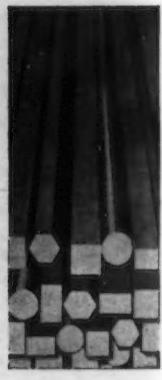
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... THE IRON AGE ...

DECEMBER 5, 1935

ESTABLISHED 1855

Vol. 136, No. 23

To the "Collectors of Little Hoards"

MOST of us, when we hear capitalism condemned, think that the soap box boys and the pink parlor professors are shooting at the big fellows. We have not regarded ourselves as capitalists. We have defined him as a man who has more money than we have.

But, of course, when you think of it, this sort of a definition will not hold water. For there is generally someone to be found that has less money than you or I, which would automatically put us into the capitalist class.

Every person, strictly speaking, who has money invested or to invest is a capitalist. Every man and woman who has shares of stock, money in the bank, real estate or a life insurance premium. There are some 30 million such people in the United States today.

It may surprise you to learn that we little fellows who have believed in thrift, in saving for a rainy day or for building a competence for old age, are class enemies who are obstructing the forward march of social progress.

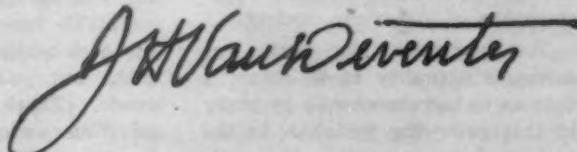
This horrible indictment is not mere gossip or hearsay. It comes from a source "close to the throne"; indeed from the lips of none other than Under Secretary Rexford G. Tugwell. For comrade Tugwell, in excoriating the enemies of class consciousness in his recent address in Los Angeles, paid particular attention to the "collectors of little hoards," together with the "receivers of unearned income and their hangers on."

The man who invests in life insurance, even as you and I, is a "collector of a little hoard" and the widows and children who may live upon the proceeds of that saving are surely the "receivers of unearned income and their hangers on."

As exponents of the principle of thrift and saving, in our small way, we have, it seems, been obstructing the "rising of common men, the irresistible strength which may sweep us forward into the future"—and ostensibly a future in which there shall be no capitalists, large or small, and no Constitution.

You can do away with capitalists, comrade Tugwell, but you cannot do away with capitalism. You might transfer the savings and holdings of our 30 million thrifty Americans and the control of capital into the hands of a small group of politicians comprising the National Capitalistic Comintern. But capitalism we must have until some one finds a substitute for money. And that has not been discovered even in your admired Russia.

Because of the many requests for reprints of editorials appearing in THE IRON AGE, the publishers have arranged to make such reprints available in any quantity desired at a price representing cost of production and mailing. Please address Reader Service Department, THE IRON AGE, 229 West 39th St., New York City.





RALPH E. FLANDERS



THE greatest fact in American history has been the existence of the frontier.

For centuries the centers of industry, commerce and settled agriculture lay in the East, expanding decade by decade in a westward progress that was uninterrupted and successful. The border line of that movement was held by the pioneers. Before them lay the unknown regions which the imagination pictured as teeming with wealth of forest, mine and soil. Behind them came the settlers, who found and developed the underlying realities of the pioneer's dream.

This physical, geographical frontier for many generations served our nation in three important ways: it gave unlimited opportunity to youth; it furnished a seemingly boundless field for the profitable investment of capital; and it generated a favorable psychology throughout the whole structure of American society.

The opportunity for youth was a visible actuality at so recent a date as to be remembered by many in this gathering tonight. In the eastern farming regions the proc-

ess was almost automatic. With the large families of a generation or two ago it was obviously impossible for all to gain a good living on the restricted home acres. The boys in due time moved outward, some to the cities (themselves growing with the growing commerce to and from the frontier) and others directly to the virgin soil and forest of the newly opened lands, where they could find the opportunity and the room to make new lives for themselves on a more ample scale.

But so wide-spreading and rich was the Western domain that the expanding population of the Eastern seaboard was insufficient to occupy and develop its resources. Their numbers were swelled by the millions from the crowded countries of Europe, who described the opportunities from afar, swarmed into the trans-Atlantic shipping, and crowded the immigrant trains into our virgin territory. The numbers of these immigrants were numbered by the millions and tens of millions. Our own population growth did not suffice. There was room for all.

Money was needed as well as men. There were farms to be equipped, mines to be opened, roads and railroads to be built, cities to be erected. For generations the savings of the settled East poured across the Alleghenies, across the Mississippi, across the Continental Divide and found profitable investment in these new and rich territories. Fortunes were lost, but more fortunes were made. There was never a word of "over-production" or "over-investment." The thought was so

ridiculous that the words were unneeded and un-invented.

Millions From Europe for Investment

As with men, so with money. The savings of the East were inadequate to the needs and opportunities of the West. In consequence, millions of dollars came pouring out of the coffers of Europe to finance the settlement of Western America, and the expansion of Eastern commerce and industry which Western development demanded. The millions grew into billions before the demand was satisfied and the stream slacked its flow.

All of this produced a national psychology of a fortunate sort. We were convinced that the future held more for us than the present and the past. We were willing to risk time and money in productive enterprise. The future, we were sure, would not betray us—nor did it. Even as our physical surrounding made our psychology, so our psychology made our future. The process was natural, healthful, fortunate beyond all accounting.

But—the frontier is gone!

No doubt we will continue, now and then, to find new oil fields. New areas of fertile soil will be irrigated and added to our inheritance of arable land. New mineral deposits will be found and exploited. All this will go on continuously for many years, yet the total effect will be small. It will not constitute the outstanding, controlling fact of our nation's history, as it did for nearly three

New Frontier

By RALPH E. FLANDERS

Presidential Address, American Society of Mechanical Engineers, December 4, 1935

hundred years. Sometime in the period since the turn of the century—not on any given day or in any given year—the physical frontier in the grand sense disappeared, and disappeared forever.

The Frontier Disappears

This was the greatest event of our times. If we are looking for some effective cause for the evils which have been afflicting us, why look further? We build up our false or inadequate theories of "over-production," when we have never had a decent general standard of living in this country; of "technological unemployment," when on technology alone can we find our hopes for the higher standards of the future; on "over-investment," when an adequate provision of goods and services to the mass of our fellow citizens requires larger and more efficient productive facilities than we have ever dreamed of. All of these explanations and many more are shallow and inadequate.

The outstanding historical event of our generation is the disappearance of the frontier, and the consequent disappearance of the old, trusted and tried opportunities for youth and the profitable investment of capital; and with these gone there is beginning to go that favorable, constructive type of national psychology which has energized our progress hitherto.

What shall we do in the face of an emergency so fundamental?

Two courses are open to us. We can readjust our social, political and industrial institutions to a future of limited opportunities

for men and for money, with a national outlook keyed down to safety as our objective, instead of the old purposeful advance toward a better future. The alternative is that we find an equivalent for the lost frontier—an equivalent which will as effectively open new opportunities for men and for capital, and make it possible for us to retain our constructive national psychology.

"Playing Safe"

For the time being, we seem to be making the first and poorer choice. In some directions deliberately and in others by indirection, we are slowing down our production of goods and services. In place of a confident advance toward business risk and personal adventure, we are all playing safe—business men, worker and farmer. We are at this moment organizing a new world of restricted production, restricted human enjoyment and restricted opportunity for the coming generation. We have chosen to play the lesser part.

We need not do this and we must not do it. For the effective equivalent of the old physical frontier lies ready at our hands for our occupation, development and enjoyment. That frontier lies so close at hand that it escapes our notice. Its separate features are so familiar to us that we have missed its significance as a whole. For the new frontier is not a distant physical region, it is an ever-present social possibility. This new social frontier is a greatly raised standard of living for the mass of our fellow-citizens.

At first sight this proposal for a new frontier may seem trite and inadequate. But let us examine it before passing hasty judgment. Let us consider first and principally its material characteristics. Of what are they composed?

A higher material standard of living does not mean higher wages, higher salaries or higher dividends. It does not mean higher prices for goods or services—least of all does it mean restriction of output. It does mean more and more goods and services at lower and lower prices relative to incomes.

Let us first consider whether a higher standard of living, defined in these terms, is physically possible. Next, let us see whether if attained, it can take the place of the lost frontier in furnishing opportunity for youth and for capital, and in providing a favorable national psychology. Finally, if these inquiries lead to favorable conclusions, let us see what it is that prevents our occupation of this new frontier, so that we may remove the hindrances and proceed with our new social advance.

Living Standards Can Rise

There can surely be no question as to the physical possibility of a rising standard of living. We have the material resources required. The very abundance of our coal fields, oil wells and fertile soil have embarrassed our clumsy institutions until we have imagined abundance to be a curse instead of a blessing. For the materials we need and do not have there are ample stores of native products for

(CONTINUED ON PAGE 110)



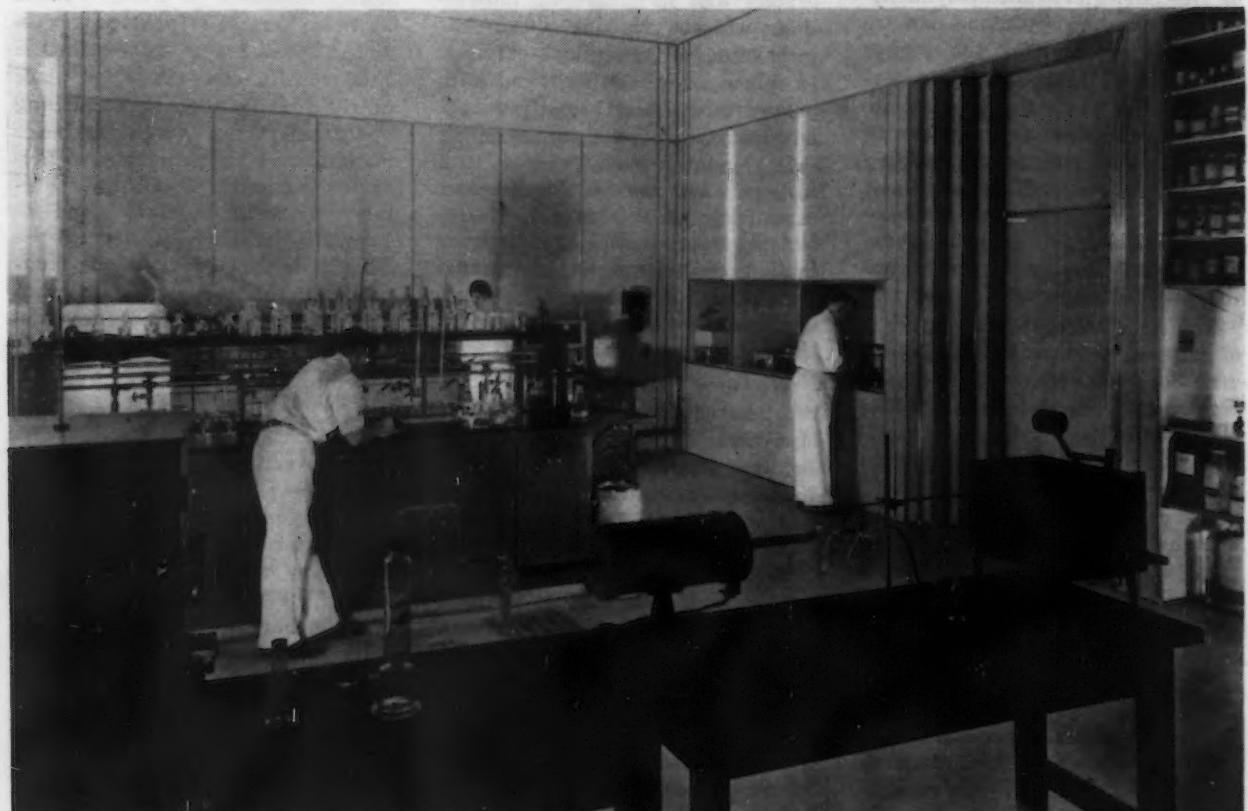
Colorful Of Porcelain Enamel Of New

A L U M I N U M leaf ceiling at left and peach-colored porcelain-enamelled walls make the color and frit control laboratory a "daylight room."

"S A T I N - M A T T" acid-resisting porcelain enamel cover the walls and ceiling of the analytical chemical laboratory.



LABORATORIES with most of their walls finished in porcelain enamel have recently been completed by the Chicago Vitreous Enamel Product Co., Cicero, Ill. These laboratories are unique because they have been designed to be the most efficient of their kind for conducting research and developing

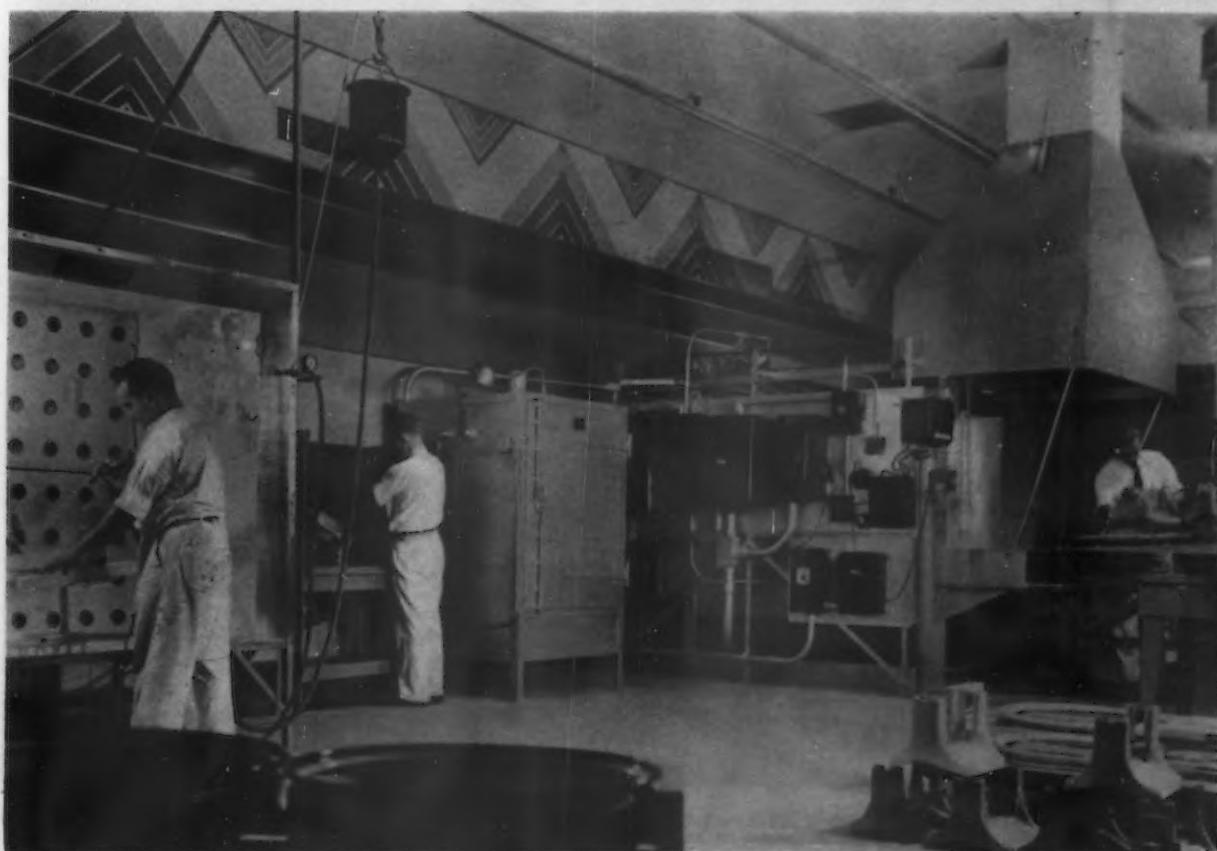


Possibilities Shown in Finish Laboratories

By ROGERS A. FISKE
Western Editor, The Iron Age

MODERN design at right rules in the office of B. T. Sweeny, research director. The walls are "velvet matt," egg plant colored porcelain enamel. The ceiling is green and bone white. Desk, filing cabinets and table tops are green porcelain enamel.

SPRAY booth and equipment, dipping tank, a dryer and a large laboratory electric furnace occupy one section of the main laboratory room.





A SECTION of the main laboratory room devoted to accurate color matching and the development of new color finishes and shades.

unusual finishes and variety of colors offered by porcelain enamel as a building material.

A main laboratory room, analytical chemical laboratory, office of the director of research, color and frit control laboratory, physical instrument room, experimental smelting department, smelt record room and shower and locker room, form the main divisions and occupy a total

area of approximately 10,000 sq. ft. Exactly 12,718 sq. ft. of porcelain enamel were used in finishing the walls, light fixtures, columns, shower and toilet stalls, furniture, and, in two of the rooms, the ceilings. A special acid-resisting "satin matt" porcelain enamel, developed for architectural purposes, was used for most of the interior finish.

In keeping with the attractive

surroundings of the new laboratory, which provide an added incentive for work, considerable thought was given to the design of the shower and locker room. This contains lockers for the laboratory personnel, two toilet stalls, two lavatories and a shower stall. A feature of the latter is a non-skid floor of porcelain enamel. Extending around the room, and even on the



THE main laboratory, 50 by 100 ft., houses three miniature porcelain enameling plants. Decorative features are indirect lighting of the frieze and columns, and horizontal porcelain-enamelled panels in graduated shades of blue.



NATURE of the work performed in the physical instrument room calls for a "darkroom," which fact determined the color scheme and lighting effects. The walls are burgundy red enamel panels and the ceiling, furniture and blinds are painted to match.

front of the toilet and shower stalls, is a porcelain enameled mural of marine design resembling an aquarium. The ceiling and upper walls are in black porcelain enamel with horizontal stainless steel strips.

An outstanding feature of the laboratory is the fact that it is completely air-conditioned through the use of water from the company's own well. The filtering of air prevents foreign materials from com-

ing into the rooms. This unit is housed in the smelt record room, where records from every smelt made in the plant of the Chicago Vitreous Enamel Product Co. are filed for reference.

To Make Study of Air Hygiene

AIR HYGIENE FOUNDATION OF AMERICA, INC., has been formed by a large group representing various industries, with headquarters at Thackeray Avenue and O'Hara Street, Pittsburgh. The purposes of this organization are to conduct investigations of and to stimulate research on problems in the field of air hygiene and to gather and disseminate factual information relating thereto.

The foundation will also cooperate with and assist other agencies active in this field and will collab-

orate in the coordination of such research efforts. A comprehensive investigation has been begun at Mellon Institute of Industrial Research, Pittsburgh, under support of Air Hygiene Foundation of America, in which the hygienic, technologic, and economic aspects of air contamination, especially by dust in the industries, will be studied.

H. B. Meller, who has been appointed managing director of Air Hygiene Foundation of America, will head this investigation at Mellon Institute. Mr. Meller has been active in research on air pollution since 1920 and is generally regarded as an authority on that subject. He attended the University of Pennsylvania and the Uni-

versity of Pittsburgh and then joined the faculty of the University of Pittsburgh as instructor in mining, 1909 to 1911. He was assistant professor of mining engineering in 1911 and 1912, and professor of mining engineering from 1912 to 1923. He was vice-dean of the School of Mines at the University of Pittsburgh from 1912 to 1914, and dean of that school from 1914 to 1923. During the past 15 years he has been in charge of the program for the abatement of smoke and dust in Pittsburgh and since 1923 has headed the air pollution investigation at Mellon Institute. He has made numerous contributions to the literature of the municipal smoke problem and its control.

Recent Developments and Trends in

By LOUIS J. TROSTEL
Chief Chemist, General Refractories Co.



THE production of refractories without burning, equally as good as fired ones, has always fascinated the refractories producer. This follows from the fact that he not only could thereby eliminate a costly item from his balance sheet but he could also reduce the time to get his product through the plant from five or six weeks to as many days. Further, there could be cut down the enormous inventories of finished products, which all refractories manufacturers carry in order to make quick deliveries. Practically all of these advantages would be shared by the consumer as well, so that the final development of unburned refractories in commercial quantities and standard sizes deserves special mention.

Earlier attempts by some manufacturers to develop unburned brick, particularly magnesite, generally resulted in chemically (organic) bonded mixtures, which were strong on drying and sintered fairly well under the heat of the furnace when used. However, two outstanding technical defects usually developed, namely, sintering was accompanied by shrinkage and the sintering was limited to the hot face of the refractory. The parts of the brick at intermediate temperatures lacked strength after the chemical bond was burned out. Another practical disadvantage of some of the unburned products was that they could not always be furnished in standard sizes.

Lack of bond and volume stabil-

In THE first half of this article presented Nov. 21, the author cited the novel principles of manufacturing which have developed improved refractories. A number of newer types of refractories were discussed.

In this second and last section it is pointed out that improved refractories are making possible better applications of materials, particularly where basic fluxes and oxides are present.

Magnesite is displacing fireclay and high-alumina brick for cement kiln linings and glass regenerator checkers. Electrocast and bonded

ity have been overcome in the refractories recently developed by the General Refractories Co. by their Ritex process in which three distinct improvements in the unit operations are involved. First, the interfitting of the grains has been developed to a maximum by using only a selected band of sizes and adding them in proper proportions. Second, the forming pressure to mold the brick has been stepped up from about 1000 to 10,000 lb. per sq. in. in order to reduce the voids between grains. This careful sizing has greatly intensified the effect of the ten-fold increase in pressure. Third, a refractory chemical bond is used which contributes to the effect of the first and second improvements.

Both a Ritex magnesite and Ritex chrome are now in regular commercial production. The brick are strong and hard when cold, well bonded at very high temperature, and show only negligible volume change when heated to service temperatures. Their greatly increased density over burned brick contributes to their slag-resisting properties. The increased strength, density, and volume stability of these products are also reflected in an outstanding property which distinguishes them from burned magnesite and chrome, namely, a high resistance to spalling. The latter

effect in high-temperature furnaces is of course the resultant of a combination of factors such as textural changes resulting from shrinkage on continued exposure to high temperature and slag, as well as thermal shock.

This property of resisting spalling is brought out effectively in Fig. 1, which shows representative samples of Ritex chrome and regular burned chrome brick after a simulative service spalling test. This is a modification of the A.S.T.M. panel test designed to show under accelerated conditions the resistance to combined thermal and structural spalling. In this test the brick were laid up as a panel, backed up with 2½ in. of insulation, and then heated to 1650 deg. C. and soaked for 8 hrs. After this treatment the panels were subjected to a spalling treatment consisting of first heating to 1200 deg. C. for 10 min. and then cooling a similar length of time with a blast of air delivered at the rate of 1400 cu. ft. per min. The brick were given a total of 10 complete cycles and then the loss in weight measured.

On the left are shown the burned brick which vitrified, cracked and eventually lost about 22 per cent of their weight. On the right are shown the Ritex chrome, which came through the test with no

in Refractory Processes and Materials

mullite are replacing clay for glass tank flux blocks. Silica is losing its importance for sidewall, port-end and roof construction of metal furnaces, because of improvements in the physical character of basic brick. Insulating brick, while yielding heat economies to the user, is shown to be creating new problems for the maker of refractories. Also referred to are better clay brick checkers, a quick setting magnesite grain for furnace bottoms, magnesite ladle nozzles to replace clay, and the use of super-duty fireclay brick for certain heating conditions involving severe spalling and slagging.

cracking, shrinkage or loss in weight.

Most magnesite and chrome brick fail in service by spalling rather than by fluxing or shear under load. The superior development of resistance to this type of failure by means of the Ritex process should prove an important factor in the expanding usage of products made according to this method.

Use of Insulating Brick

One of the important properties of refractories which fit them for their special field of engineering materials is the ability to confine heat. By inducing high cellularity and proper strength in refractory clays and other minerals, there have been developed in the past few years refractories suitable for lining the interior of furnaces, thereby greatly increasing their ability to reduce heat losses.

The cellularity of the mass in the commercial processes now in use is accomplished in a variety of ways, such as (a) burning out a carefully sized combustible like sawdust or cork, (b) vaporizing at drier temperatures a volatile organic material such as naphthalene, and (c) combining gas bubbles

with a finely ground plastic mass or slip. The bubbles may be produced by mechanical aeration or by gas from a chemical reaction of certain batch constituents, followed in either case by stabilizing the foam so generated.

The use of expanding minerals such as cyanite and vermiculite to induce cellularity, while holding possibilities, has not been extensive for insulating firebrick for lining furnaces. Vermiculite, as well as diatomaceous earth, however, have been incorporated in insulating brick for use on furnace exteriors.

Most efforts to date have been directed toward producing brick with as high a thermal resistance as possible without too much sacrifice in strength, the latter being generally directly proportional to the bulk density of the product. Fig. 2² shows the variation in thermal conductivity (K) of several cellular clay bodies at room temperature with density. The value of the latter for fireclay insulating firebrick ranges from 40 to 50 lb. per cu. ft. and the K value from 1.1 to 1.3. Diatomaceous earth brick at one extreme have a density of about 35 lb. per cu. ft. with a K value of about 1.0, and regular commercial firebrick at the other extreme with a density of nearly 130 lb. per cu. ft., though not shown on this curve, have a K

value of about the order of 3.0. It is probable that the same relationships will hold at furnace temperature, since at least for clay refractories the K value rises almost as a straight line function of the mean temperature. In general the average insulating firebrick will be found to have about one-third the density and thermal conductivity of ordinary fireclay brick.

Two other critical properties of these refractories are the shrinkage and spalling at furnace temperatures. Both properties are more exaggerated than in the usual refractory. The shrinkage is dependent partly upon the clays used and the thin cell walls of the product. The spalling tendency is related to the low conductivity which sets up steep heat gradients and accompanying high stresses in a body of naturally low mechanical strength. This can be offset to some extent by inducing a certain degree of elasticity, by properly designing the mix.

Application of Newer Refractories

The application and uses of these newer refractories are based on the attempt of the manufacturer to supply materials to suit changing and more severe service needs of the consuming industry, such as increased temperatures, faster heating schedules and a greater number of operations of intermittent character. There is no evidence that users of refractories are redesigning or adapting their furnaces to the refractories of 10 years ago.

A great many chemical and metallurgical processes operating at high temperatures have long been confronted with the problem of attack of the basic oxides or slags incidental to the process on the furnace refractories in use. Typical of these industries are those manufacturing cement and

² Bulletin No. 84, Ohio State University Engineering Experimental Station, p. 25.

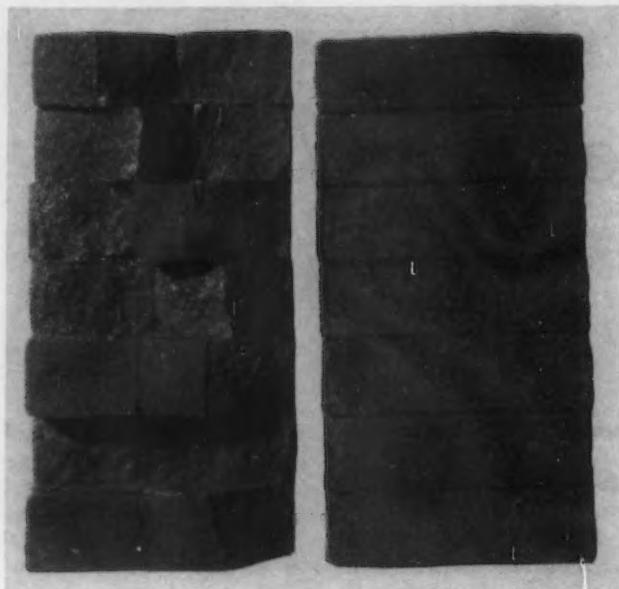


FIG. 1—Comparative resistance to spalling of Ritex and burned chrome brick.

dolomite clinker, glass, basic open-hearth steel and the smelting and refining of copper. The basic refractories offered these consuming industries, until the last two or three years, were generally satisfactory chemically but not structurally. In particular the basic refractories were weak in their resistance to spalling and ability to carry loads at high temperatures. Accordingly compromises have been made all along the line. One of the recent outstanding accomplishments in the application of refractories has been the ability of the consumer who must contend with basic fluxes to now obtain the proper refractory, both from a chemical and structural viewpoint.

For instance, the original type of lining for the hot zone of rotary cement and dolomite kilns was made of fireclay brick. Later came the high alumina brick of 70 per cent alumina because it had a higher P.C.E.⁴ value of 37 (1820 deg. C.) as compared with about 32 (1700 deg. C.) for clay brick. Magnesite brick were recognized as the logical refractory, but because of the high spalling character of the burned brick, practically no cement kiln operator ever used them. He preferred to get along with a brick chemically wrong but physically better. Ritex magnesite now have shown several years of extremely satisfactory

service in this type of kiln and some interesting data in this connection have been compiled. In one cement plant, 27 former linings of either the 70 per cent alumina or fireclay brick type lasted an average of 54 days. This is to be contrasted with 310 days for one Ritex lining and 421 days for the second. The production on the second lining has been about seven and one-half times that of the older type linings, and the saving, based on lining cost per barrel of cement produced, is three times the cost of the lining.

In the manufacture of glass, conducted at such high temperatures as 1300 to 1650 deg. C., the presence of soda is always a problem in the use of the refractories for the superstructure and regenerator checkers. Furthermore, the glass which is maintained well above its melting temperature in

a fluid condition acts as a solvent on the aluminum silicates used for the refractories constituting the flux, or tank blocks, port sills and jambs. The extent of corrosion has increased, particularly since the industry has turned to machine-made ware with the use of higher temperatures and heavier production per unit, making the necessity more acute for refractories which are correct chemically as well as physically.

Silica brick are still generally used as roof brick because of their load-carrying ability, although they are decidedly acid and suffer corrosion from the soda dust. Advancement has been made, however, in refractories for the checkers. Two well known properties of magnesite brick have long suggested them as the proper checkers for glass regenerators, namely, the fact that they have the highest heat capacity and conductivity per unit volume of any type of refractory which might be used, together with the ability to resist fluxing by the soda. Clay brick were used originally, then high alumina or kaolin, and in the past year Ritex magnesite. Ritex magnesite, observed after one year's service, have kept clean and serviceable. They did not flux or spall and could be salvaged and reused, while kaolin and fireclay brick exposed simultaneously fluxed badly and had to be discarded.

At points where molten glass is the problem, electrocast mullite and bonded cyanite are being substituted for clay in increasing tonnages. Electrocast mullite is admirable for this purpose since the porosity is only about 0.5 per cent as compared with 22 to 29 per cent in clay flux blocks and the surface of the refractory exposed for sol-

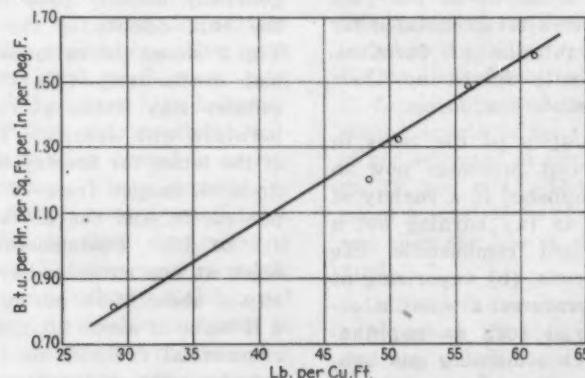


FIG. 2—Variation of thermal conductivity of cellular clay bodies with weight.

vent action is reduced to a minimum. Both electrocast mullite and cyanite have the advantage of a P.C.E. value of about 37 as compared with 32 for clay brick, and a margin of safety is acquired before melting or reaction can proceed. In addition the highly crystalline character of these two refractories together with increased resistance to the solvent action of the glass because of the high alumina content of the mullite make them improvements over clay brick.

Refractories for Steel Making

In the field of ferrous and non-ferrous melting, the use of magnesite and chrome brick has long been established, particularly in hearths and bottoms, because of chemical resistance to the basic slags present. Generally they have not been used above the slag line and for roofs, because of their spalling weakness and lack of sufficient volume stability under the heavy loads and stresses of the wide sprung-arch type of roof construction used. An acid refractory, silica, has been necessary at these points.

The refractory problem has become more acute with the increasing use of insulation on the outside of open-hearth sidewalls and roofs. Insulation has resulted in raising the temperature on the cooler side of the brick from below a dull red to a red heat, and increasing the severity of fluxing and spalling conditions at the fire face of the brick. Improvements in the physical character of chrome brick to make them more resistant to spalling and slagging both as the burned product and as Ritex chrome have now made it possible to make the logical substitution of these brick in front and back walls, corner walls, ports and bulkheads, as well as intakes and division walls. A definite heat economy further may be realized by the use of the Ritex chrome brick because of the unique character of their thermal conductivity. As indicated in Fig. 3, the conductivity determined with an apparatus of the Wilkes type⁵ is very much less than that of burned chrome and the temperature coefficient is negative. At temperatures above 400 deg. C. the conductivity is even less

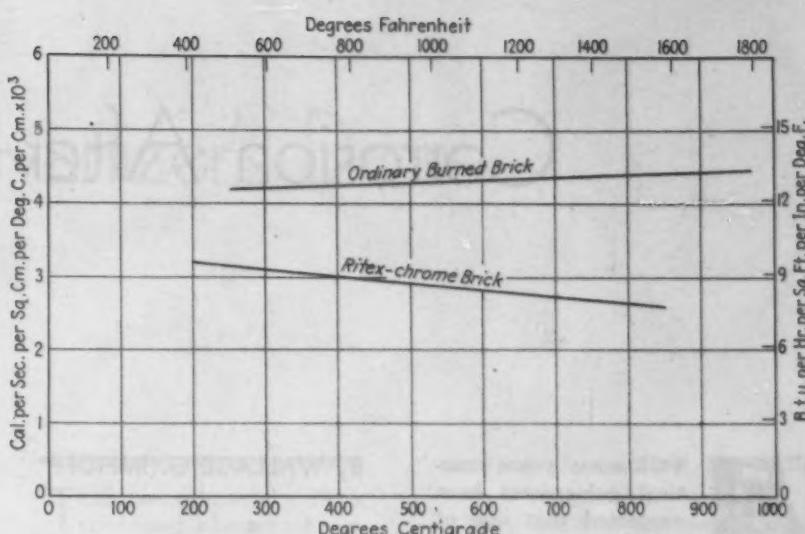


FIG. 3—Thermal conductivity of Ritex-chrome brick as compared with fired chrome brick.

than that of silica brick and dense fireclay brick. These important improvements in chrome brick point to their eventual use as roof brick.

In reverberatory furnaces for smelting and refining copper it is possible to observe the same trend in the substitution of improved basic brick for silica brick at points other than bottoms. Side-walls and roofs are now constructed of Ritex magnesite. These bricks have been used in conjunction with silica as part of roofs of the sprung-arch type and entire roofs made of Ritex magnesite of the suspended arch type of nearly a 22-ft. span are regular practice. Such roofs have given as much as seven times the life of silica roofs. Magnesium silica brick from olivine have also been tried.

Refractories have been improved to meet specific conditions at other points in the manufacture of iron and steel. The high density achieved in de-aired fireclay brick has increased their heat capacity and made them better as heat exchange media in blast furnace stoves, open-hearth regenerator chambers, and similar types of installations. Lately a high-lime magnesite which sets quickly is displacing pure magnesite grains for building up basic bottoms. Time is saved in burning in bottoms and patching between heats and the lower price of the material makes it possible to reduce the cost of refractories per ton of steel produced. These high-lime magnesites contain only one-third to one-half as much CaO as the prepared com-

mercial dolomite clinkers used for patching open-hearth bottoms.

For pouring steel, clay ladle nozzles have been in general use. They suffer badly, however, from cutting out by magnesite dioxide. Magnesite nozzles have been found to be a very successful substitute.

Boiler furnaces operated at high ratings, such as those in central power stations and in marine service, are proving to be a field of special application for the new super-duty fireclay refractories, because of the excellent spalling and slag resistance of these brick.

In small electric furnaces, domestic oil-fired heaters or for furnace walls where special or complex shapes are required, which costs do not warrant making up in large amounts, it has been the practice to use rammed-in plastic linings of various refractory materials. It is now possible to obtain refractories with a hydraulic set which may be cast in place. A refractory high alumina cement is used and castable mixtures from practically all refractory materials may be produced.

Stated generally, the most advantageous applications of the new insulating refractories as furnace linings are for intermittently operated furnaces. Such brick shorten the time required for heating-up, by eliminating the heat lost by storage in the walls before they have become saturated. This is aside from the structural advantage of being able to make lighter weight furnaces.

(CONTINUED ON PAGE 95)

⁵ G. B. Wilkes, Journal American Ceramic Society, 16 (3) 125 to 30 (1933).

Corrosion After Pickling Major



FOR many years practical galvanizers have suspected that one of the most prolific sources of dross was the corrosion that forms on the surface of work after pickling. Anyone who has spent even a short time in the practical operating end of hot-dip galvanizing soon discovers that the amount of dross produced is in direct proportion to the production put through the bath. That is, the greater the production the greater the amount of dross made.

Therefore it is of practical interest at this time to mention the different sources of dross, although they will not be discussed at present. The purpose is rather to indicate how dross is made, and where the materials come from. Inasmuch as dross is composed of zinc and iron, the feature of interest is to show where the iron comes from. The sources of iron to form dross are (1) the zinc used, (2) iron oxides formed on the surface of the work after pickling, (3) iron salts in the picking solutions, (4) iron from the galvanizing pot, (5) iron from the action on the base material, and (6) iron furnished by material lost in the pot.

At this time attention is given to just one of these sources of iron. No. 2 or iron oxides formed on the surface of the work after pickling.

The next practical question is naturally, "What are these salts of iron either left on the work after pickling or formed on the surface by corrosion?" The answer is not so difficult if the practical facts are closely studied and then properly correlated with theory.

Pickling is done with either sulphuric or muriatic acid. If the

By WALLACE G. IMHOFF*

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pickling is done with sulphuric acid then the iron salts left on the work will be iron sulphates. If the work is dried very quickly these iron sulphates will be in the form of a white powder over the surface. This is the dehydrated sulphate, the white color of the deposit being due to the lack of water. On the other hand if water is present then the iron sulphate, which is in the form of ferrous sulphate, is green in color. The deepness of the green depends upon the amount of water present, the amount of iron present and the time of exposure to the air.

If the work has been either pickled in muriatic acid or given a final dip in muriatic acid, then these iron salts may be iron chlorides instead of iron sulphates. The salts formed with muriatic acid are ferrous chlorides, and they range in color from different shades of green to almost a yellowish tinge.

The third corrosion product found on the surface of fresh pickled work and work that is on the dryer, is iron oxide, the yellow, brown, and red ferric oxide. This corrosion product is often the result of the secondary change that takes place in exposing iron sulphate or iron chloride to the action of the air. The corrosion changes these sulphates and chlorides of iron to the insoluble iron oxide commonly known as rust. The color of the rust formed depends on the amount of water it contains, the light yellow colors through light tan brown carrying considerable water, while the dark browns, through dark red browns, to deep red brown ferric oxides contain

very little water in chemical combination.

Now that the sources of iron and the different iron salts formed in pickling and corrosion have been revealed, it remains for a very thorough research investigation to definitely prove that the iron obtained to form the largest quantity of galvanizer's dross, which is an alloy of iron and zinc, is derived from this corrosion of the surface of the base metal by the acids, and drying of the water while exposed to the air and heat of the dryer. The corrosion products formed are iron sulphates (ferrous sulphates), iron chlorides (ferrous chlorides), and various combinations of iron rust (ferric oxide and water).

The purpose of the research investigations herewith submitted is to definitely prove that the iron needed to form very large quantities of galvanizer's dross is derived from the corrosion formed on the surface of the base metal after pickling and during drying. Since in most cases the final product of corrosion is rust, it was decided to start the investigations by using the ferric oxide of iron as the corrosion product to come in contact with the molten zinc. Attention is called to the fact that since the investigations have been made the results show that the light ferrous sulphates and the ferrous chlorides, as well as the soft yellow "sull" or water rust formed by corrosion, are all much more easily reduced by molten zinc at galvanizing temperatures than the red ferric oxide.

Believing that molten zinc at hot-dip galvanizing temperatures was a very strong reducing agent, the series of tests were planned to duplicate not only the action at galvanizing temperatures, but far above any temperature ever attained in galvanizing pots. The

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Source of Galvanizer's Dross

following method of procedure was employed.

Experimental Procedure

A definite weighed amount of zinc and iron oxide was placed in a clay crucible free of iron in any form. This gave assurance that any iron found later in the zinc would have to come from the iron reduction of the iron oxide by the molten zinc. This definite amount of zinc and iron oxide were heated together for 6 hr. in a small enclosed furnace especially used for experimental purposes. Every two hours the melt was stirred with a glass rod, in order to make sure the iron oxide was well mixed into the molten zinc. At the end of the six hour heating period the gas in the furnace was turned off and the crucible and melt allowed to cool in the furnace over night. The next day the melt was examined, one half being used for analyzing the melt for iron, and the other half used for microscopic investigation to note the action of the molten zinc on the iron oxide.

Fig. 1 shows the various melts as removed from the different clay crucibles after each test was made. It will be seen that the tests were made at 800, 850, 900, 950, 1000, 1100, 1300, and 1565 deg. F. The critical and important temperatures from the practical galvanizer's standpoint are those from the melting point of zinc to 950 deg. F. Very seldom do galvanizing baths ever go higher than 950 deg. F., and even when they get to 950 deg. F. previous investigations have shown much damage has been done to the quality of the metal in the bath.

Too much detail will not be given in commenting on each test. It is considered important however that some comment should be made

THE experimental data contained herein have never been released anywhere before, and since they definitely prove that one of the most prolific sources of iron to form galvanizer's dross is from corrosion after pickling and during drying, they should be of extreme interest to all those interested in galvanizing. This article covers the reducing action of molten zinc on rust and the ferric oxide of iron formed by corrosion, and is the first section of a series of three articles. The second section, which will appear in a following issue, studies under the same conditions the reducing action of zinc on black and magnetic iron oxide, and the third section is devoted to the influence on ordinary scale, which sometimes is not pickled entirely off the work before it goes into the bath.

at each temperature to bring out the facts, otherwise something might be overlooked by those not having had contact with the investigation. It is advisable to examine carefully all the melts shown in Fig. 1.

The view on the left in Fig. 2 shows the following features of interest: (1) The development of zinc-iron alloy from the iron oxide granule; (2) the large particle of iron oxide is made up of a round area which is still iron oxide, a dark area of the dark green zinc-iron alloy, and small dross crystals in both of these areas; (3) a clouded area of zinc oxide around the particle; and (4) granular

zinc-iron alloy around the whole area (light area).

Thus this first test made at 800 deg. F. conclusively proves that molten zinc at galvanizing bath temperatures has a reducing action on iron oxide. This action would be much faster and easier of accomplishment on the soft yellow iron oxide known as "sull" or water rust.

The middle view in Fig. 2 illustrates the reducing and alloying action of the molten zinc on iron oxide at a temperature of 850 deg. F. The points of interest are: (1) the light areas of zinc-iron alloys which have formed from the various iron oxide granules, (2) the dark zinc-iron alloy developing into dross crystals (the rhombohedral and hexagonal forms can easily be recognized), (3) the small dross crystals forming in the granular zinc-iron alloy area, and (4) the large rounded areas of zinc-iron alloy which were originally the iron oxide granules.

The average galvanizing bath temperature is about 850 deg. F., and although this is a little low for some work many kinds of galvanizing furnish a beautiful product at this temperature. The results of the test at this temperature show clearly that the molten zinc has a decided reducing action on the iron oxide. By closely examining the middle photo in Fig. 2 it will be seen that most of the large iron oxide granule outlines can still be seen. Two things have happened, namely, part of the zinc formed zinc-iron alloy and part of it formed zinc oxide during the attack on the iron oxide. The iron has combined with the zinc to form zinc-iron alloy and the oxygen of the iron oxide has oxidized some of the molten zinc to zinc oxide.

The illustration on the right in Fig. 2 shows the action of the

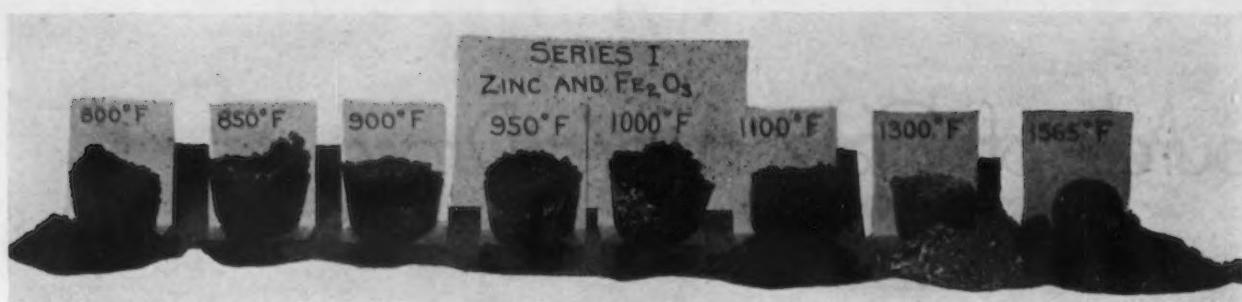


FIG. 1.—Results obtained when molten zinc and iron oxide (ferric oxide) are heated together for 6 hr. and cooled slowly. As indicated, the tests were made at various temperatures throughout the galvanizing range, up to a final temperature of 1565 deg. F.

molten zinc on the iron oxide at 900 deg. F. Practically all galvanizing can be done between the temperatures of 820 and 870 deg. F. In metalware the best temperature to give a beautiful finish has been found to be between 855 and 865 deg. F., but for heavier work like tubs the temperature will perhaps be 870 to 875 deg. F. For small pipe the bath is often carried as high as 880 deg. F., but it is seldom that temperatures over 885 deg. F. are ever reached in good hot-dip galvanizing plants. Thus at 900 deg. F. the temperature is just a little above the usual galvanizing bath temperatures for any class of work, although it is not uncommon to find a temperature of 900 deg. used in some plants. Such a high temperature of course makes excessive dross and tends to give a short pot life.

Results at 900 Deg. F.

Some very important things have happened at 900 deg., and the following features of interest may be seen in the illustration to the right in Fig. 2. (1) There are still

large granules of undigested iron oxide, (2) the structure of the metal is extremely porous, (3) there is a large amount of zinc-iron alloy present, and (4) there is a segregation of zinc-iron alloy as seen by the large spot in the center.

This test shows very clearly the strong tendency of the zinc-iron alloy to segregate to form a crystal. There seems to be two prominent components to the zinc-iron alloy, namely, that formed in mass from the reduced iron, and that segregated together and which has assumed the form of a dross crystal.

The view on the left in Fig. 3 shows this segregation tendency still stronger. Like the sample just described it also shows the action of molten zinc on iron oxide at a temperature of 900 deg. F. Attention is called to the fact that the zinc-iron alloy spot in the middle is practically clear from iron oxide or any other material. By examining this photograph the sequence seems first to be the

formation of zinc-iron alloy by reduction of the iron oxide, alloying of the zinc with the iron and then a segregation of zinc-iron alloy caused by the forces of crystallization.

The center picture in Fig. 3 shows the results of the test of the action of molten zinc at 950 deg. F. on iron oxide. The picture shows many things of extreme interest to the practical man in the galvanizing shop, some of which are (1) the development of a vast number of small dross crystals, (2) the entire field is composed of granular zinc-iron alloy, (3) there is a total absence of zinc, (4) the melt has a spongy, porous character, (5) there is a thorough digestion of the iron oxide granules at the bottom of the specimen, (6) there is a change from bright red to dark blue of any iron oxide granules found in the top of the specimen, and (7) there is a large area of rich zinc-iron alloy showing the development of the dark green shiny zinc-iron alloy. This area is seen to be taking the shape of a parallelogram, with dross crystals developing inside the boundaries.

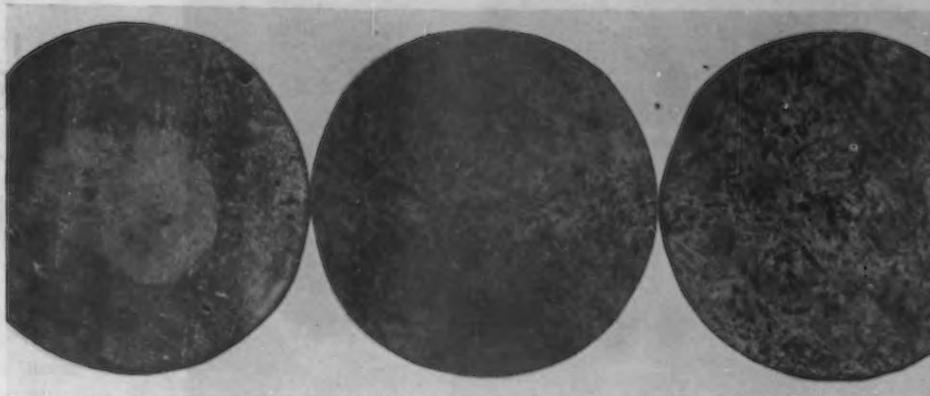
The almost complete digestion of the iron oxide and the existence of a large amount of zinc-iron alloy demonstrate and prove conclusively that dross is formed from the iron oxides of corrosion by the reducing action of the molten zinc on the iron oxides.

The photograph to the right in Fig. 3 shows the results of the reducing action of molten zinc on iron oxide at a bath temperature of 1000 deg. F. Temperatures this high are never reached in galvanizing baths except when the heat has gotten out of control and the zinc is badly overheated. The interesting facts that have resulted from the test at this temperature are (1) the zinc is completely



FIG. 2.—Molten zinc and iron oxide heated in a crucible made of pure clay and containing no iron to a maximum temperature of 800 deg. F., 850 deg. F. and 900 deg. F., from left to right respectively. Specimens maintained at these maximum temperatures for 6 hr., stirred every 2 hr. and allowed to cool slowly. All photos at 36 diameters.

FIG. 3.—Molten zinc and iron oxide heated to 900 deg. F., 950 deg. F. and 1000 deg. F., from left to right respectively. Heated 6 hr., stirred every 2 hr. and allowed to cool slowly. All photos at 36 diameters. Note the following: (Left) The iron oxide particles have been almost digested, and the dross formed (zinc-iron alloy) has collected in one large spot at the center; (middle) three distinct phases are to be seen, namely, undigested iron oxide, a zinc-iron alloy segregation in the center and a formation of small dross crystals; (right) at this temperature the iron oxide has practically all disappeared, and the melt consists of zinc-iron alloy and dross crystals.



changed to zinc-iron alloy, (2) the large number of dross crystals and their increase in size, (3) the distinct crystal forms of the dross crystals and their darker appearance, (4) the homogeneity of the zinc-iron alloy, (5) the complete absence of the iron oxide granules of the melt, and (6) large areas of zinc-iron alloy filled with dross crystals.

Temperature of Bath Vital Factor In Reduction of Oxides

It is now becoming very apparent that not only does dross form from the iron oxides due to corrosion, but that the temperature of the galvanizing bath is a vital factor in the speed and completeness of the reduction of the iron oxides. Attention is called to the fact that above 900 deg. F. the crystallizing forces which shape the zinc-iron alloy into dross crystals become very strong. The reducing action of the zinc bath on the iron oxides becomes faster and more effective with each increase in temperature of the bath.

The view on the left in Fig. 4 no longer leaves the slightest doubt

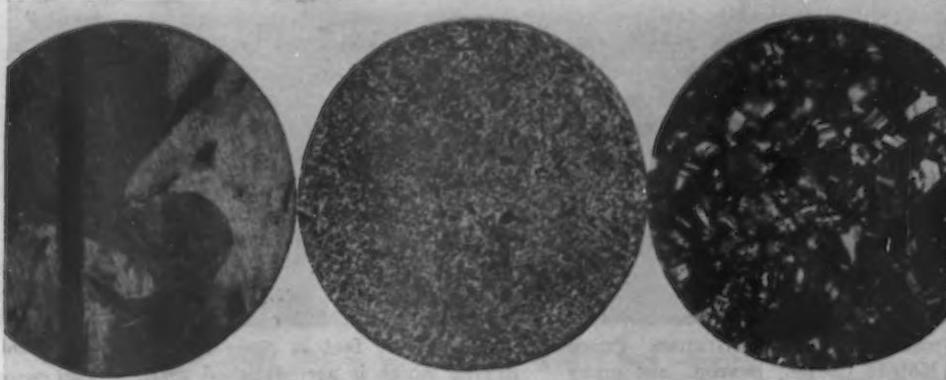
that dross is formed from iron oxide of corrosion of the base material after pickling. Note how the bath has cleared up and the formation has made clear-cut distinct dross crystals. These are shown in the photograph by the very black crystals seen in the large zinc crystals. The assimilation of the large black dross crystals of the smaller ones can be seen plainly. The outline form as evidenced by the strong tendency or forces of crystallization can be seen in a number of these uncompleted crystals. The features of interest in this test are (1) complete formation of the dross crystals from the iron oxide, (2) extremely large crystals formed, (3) clear appearance of the zinc crystals, (4) practical disappearance of the granular zinc-iron alloy in favor of distinct dross crystals, (5) tendency for the granular zinc-iron alloy to cut the zinc crystals into irregular blocks, (6) solid state of the metal and its clearness, (7) total absence of any iron oxide particles, (8) distinct parallelograms and hexagonal forms of the dross crystals, and (9) large

crystals seem to be settling to the bottom of the melt indicating that they are heavier than the melt.

The middle view in Fig. 4 shows that a number of important things happen when the molten zinc and iron oxide have been heated to a temperature of 1300 deg. F. The illustration just described was heated to 1100 deg. F., and a glance at these two illustrations shows quite a difference in appearance. The following interesting things have happened in this test at 1300 deg.: (1) There is a complete change in the appearance of the melt as compared to the one at 1100 deg., (2) striking appearance of oxidation of the zinc, (3) the mass of exceedingly fine dross crystal fragments, (4) the zinc-iron alloy matrix, (5) complete absence of zinc crystals, (6) complete absence of any iron oxide, (7) dross crystals seem to be many and small instead of large ones as seen at 1100 deg., and (8) the metal was solid in the specimen.

An important feature that becomes apparent at this tempera-
(CONTINUED ON PAGE 116)

FIG. 4.—Molten zinc and iron oxide heated to 1100 deg. F., 1300 deg. F. and 1565 deg. F., from left to right respectively. Heated for 6 hr., stirred every 2 hr. and allowed to cool slowly. Note the following: (Left) The large zinc crystals with a black dross crystal crossing them like a bar. Other dross crystals at different angles are visible as black areas in the zinc crystals; (middle) in this case the temperature is so high that oxidation has started, as shown by the white borders around the dross crystals; (right) of special interest is the shape of the dross crystals collected at this temperature.





DRYING work as it passes on a traveling conveyor with a gas torch. This method eliminates the burn-off oven.



IN the finishing and japanning of fenders and other automobile parts the work is first washed, rinsed and dried in a single oven through which the parts are carried on a traveling conveyor. When the parts emerge from this oven they pass by operators with gas fired torches where huge flames are directed onto them. This method is effective as it eliminates all handling of parts and does away with the usual burn-off oven completely.

The first company to use this method was the Graham Paige Motors Corp., Detroit, but many

other companies have since adopted it. In the Graham factory the work first passes through a washing machine consisting of a steel cabinet 5 ft. wide, 35 ft. long and 7 ft. high in which are two tanks, one for a cleaning chemical and one for clear water which are heated to 175 deg. F. by live steam.

Rising above the tanks and on both sides of the cabinet is a series of vertical pipes each with a number of jets. The hot water and solution is forced through these jets against the work by two pumps delivering 800 gal. per min. The last five feet is reserved for drying which is accomplished with

Japanning Cost Reduced By Gas Drying

By J. B. NEALEY
American Gas Association

two series of vertical pipes, the first delivering jets of air at 100 lb. pressure against the work and the second heating it with gas flames.

Now instead of the work passing into the usual burn-off oven, any remaining water or dirt is burned off with torches as described. Each of these torches is made up of several nozzles, and several rubber hose fuel supply lines, and gas is the fuel utilized. Of course, the number of nozzles used per torch is varied from one to four to suit the size of the resulting flame to the work in hand. Each nozzle has two hoses, one for gas and one for

air. Air is supplied at 100 lb. pressure and gas at 12 oz.

Move on Overhead Conveyor

The parts thus treated move along on a single chain overhead conveyor, but, after the tack-off, are transferred to another conveyor that carries them through the japan oven. This conveyor is of the double chain rod type. The oven is of the "A" type and is in two sections in tandem for two-coat work. A four-coat finish is given, the work being put through twice with a "sanding" in between. The two ovens, together with dip tanks, drain boards and other accessories, form a continuous and automatic unit.

An important feature of these ovens, also originating in the Graham factory, is a system of viscosity and temperature regulation. It automatically maintains the enamel at the correct viscosity and temperature, recovers all drip, and provides continuous filtration to insure clean enamel, thus eliminating waste. Each oven is 12½ ft. wide and has a head room of 6½ ft. in the legs. The legs are 34 ft. in length while the horizontal sections of the ovens are 12 and

15 ft. respectively. A tank of japan is in front of and below each oven, the conveyor dipping the work into them as it passes.

These units consist of light steel frames to which are attached standard sheet steel panels. These are insulated to a thickness of 6 in. throughout the heat zone and 3 in. in the lower half of the legs. As stated, the conveyor is of the two-chain bar type. It is 11 ft. in width and the 1½ in. bars are spaced a foot apart. This conveyor has a weight of 53 lbs. per linear foot. When operated at its customary speed of 36 in. per min., 6890 lbs. of conveyor enters the oven every hour. In other words, this much must be heated hourly in addition to the work sent through.

Heated by Gas-Fired Units

This oven is heated by separate gas-fired heaters, one for each section, which set in two fireproof rooms located below the ovens. These are of the barrel type of insulated sheet steel with a gas burner firing into one end and a fan located at the other. This fan draws the hot air out and forces it into the oven. The temperature

is maintained mechanically with an automatic temperature control consisting of a thermostat and motor operated valve in the gas supply line to the burner.

A temperature of 490 deg. F. is thus maintained in the high heat zone of each oven. The work remains from 35 to 40 min. in these ovens and for about 40% of this time is in the high heat zones. Originally these ovens were heated with indirect air heaters fired with oil. They were located in the rooms now occupied by the gas fired heaters and when they were replaced by the gas units, the latter were coupled to the oven supply and delivery ducts already in place. No other changes were made.

However considerable economy of operation and maintenance costs resulted from the use of gas over oil. Formerly it was necessary to light the oil heaters at three or four o'clock in the morning in order to bring the ovens up to heat by 7 o'clock. After the installation of the gas heaters it was soon found that the heaters could be lighted at the same time production started (7 a.m.) and that the ovens would be up to temperature by the time the work started to enter the first oven. Experi-



WORK entering gas-fired japanning oven on overhead traveling chain type conveyor.



DRYING fenders just washed with gas flames from torches held in hand. The work then enters the japan oven where it is dipped in japan and dried.

ments were then conducted to improve economy by reducing the air supply to the heaters. It was found that the air washers and fans, used with the oil heaters, were unnecessary so they were removed.

The air is now drawn through cloth filters only. The filters were equipped with sliding dampers, and these were adjusted so that the air temperature at the outlet of the heaters is about 700 deg. F.

with the burners wide open. The average hourly gas consumption was reduced approximately 25% by these adjustments. The change-over from oil to gas also resulted in a lowering of fuel costs.

Floating Agitators Installed by Wheeling

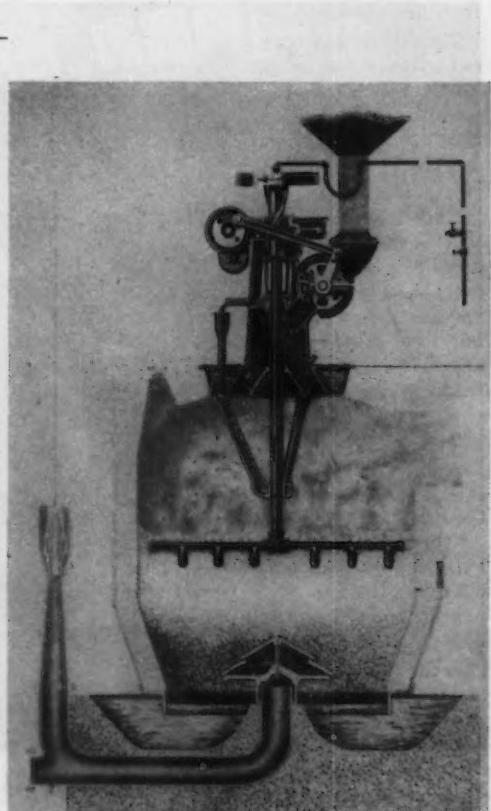
In order to bring up to date and increase the efficiency of five obsolete, hand-poked gas producers in its Steubenville, Ohio, plant, the Wheeling Steel Corp. has installed five Chapman floating agitators.

The floating agitators are continuous stirring devices that convert wasteful, hand-operated gas producers to semi-mechanical feed. They have two functions: (1) to feed the coal into the producer and distribute it evenly over the fire bed; (2) to stir the fire bed and keep it leveled off, preventing blow holes. Hundreds of these agitators have been used to modernize obsolete gas producers in steel and glass plants.

The Wheeling Steel Corp. anticipates four direct results from

the installation of the agitators: increased heating value of the gas produced; less waste of gas because of uniform feed and fire bed; considerably less attention required; increased producer capacity and consequent increased furnace capacity.

The photo shows the Chapman floating agitator with automatic coal feed installed on a hand-poked type of gas producer similar to the producers being modernized by the Wheeling corporation.



Comprehensive Line of Oil and Grease Forced-Feed Lubricators

AUTOMATIC positive forced-feed oil and grease lubricators for a wide variety of applications, including steel mill and coke plant equipment, automatic machine tools, high-speed punch presses, and stationary and motive power plants, are being marketed by the United American Bosch Corp., Springfield, Mass.

Features include simple and compact design, and consistent flow of lubricant at all times, rather than at set intervals. Savings in lubricant itself by forced feeding the right amount, and no more, as well as savings in labor, power, and machine upkeep are also emphasized. The lubricators are entirely mechanical in operation, requiring no auxiliary medium, such as air pressure, to convey the lubricant to the bearings. They have no valves, springs, nor packing, and are driven by the machine on which they are mounted.

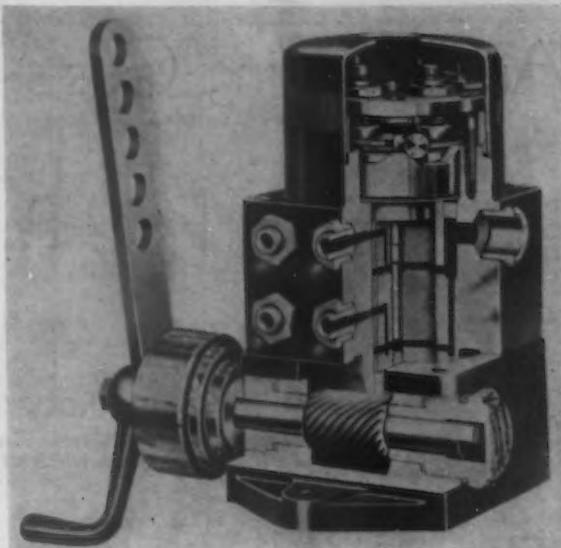
Illustrations herewith show a cut-away view of the type EP oil lubricator; an application of a type EU unit, and one size of the type K grease lubricator.

The type E, available in various sizes, with either rotary or oscillating drive, and up to 48 feed outlets, is designed to provide centralized lubrication for all kinds of metal-working machines and for special automatic machinery. All but two models of the E type unit are self-contained and have an oil tank.

In this type of Bosch lubricator a centrally located pump plunger forces the oil into twin outlets with independent adjustment of the oil-feed. The pump system has six oil-feed outlets on two opposite sides. The oil suction inlet is located on the third side.

The pump shaft, which serves as a distributor, is rotated by worm gearing, and the pump plunger moves in its concentric bore. The 12 radial holes in the pump shaft register with corresponding outlet channel ports in the pump body. Oil is taken in at every sixth part

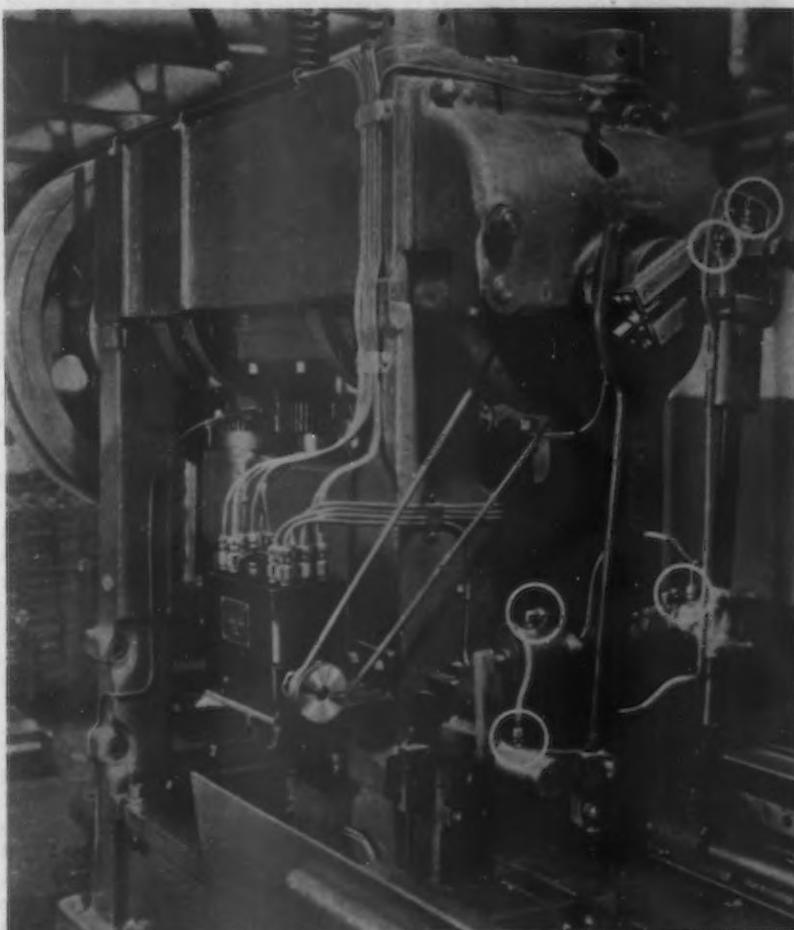
CUT-AWAY view of Bosch forced-feed lubricator (EP 12), showing centrally located reciprocating pump plunger serving 12 outlets. The rotating pump shaft, which distributes the oil, is shown in register with two outlets.



of the revolution of the pump shaft through two of the radial suction holes, and forced under pressure by the pump plunger through two of the outlet channel ports. The lower fixed cam disk and the conical heads of the oil-feed adjusting screws acts as a guide track race for the toggle which moves the

pump plunger. The outer arm of the toggle is alternately pushed downward by one of the conical heads of the adjusting screws and upward by one of the lower cam races. This movement determines the plunger stroke.

Oil feed is increased or decreased
(CONTINUED ON PAGE 120)



APPLICATION of automatic positive forced-feed lubricator on automatic press for making laminations. The 12 outlets feed 17 lubricating points through bifurcation of feed tubing.

Arc Welding Costs Reduced By Cross Field Principle

By M. S. HANCOCK

Manager, Industrial Motor Engineering, Westinghouse Electric & Mfg. Co.

THE "what" and "why" of advantages obtainable from the new cross field welding generator being announced this week by Westinghouse are outlined in the following paragraphs. The new design hinges on two basic requirements, namely, constant current volt-ampere (or load regulation) curves, and no mutual inductance between exciting and differential field coils. Studying the series-excited type machine, which can have no mutual inductance since it has no separate excitation or shunt excitation, the company's designers perfected a new control scheme that provides both constant current v.-a. curves and excellent transient characteristics. Operating on a cross field principle, this new generator is said to have the advantages that it can be preset for a given welding current, which it maintains regardless of fluctuations in line voltages, and that it is safe in operation due to low open-circuit voltage. Marked reduction in number of parts is also a feature of the new design.

The previous major development of the company, in 1929, was the FlexArc generator using a transformer to eliminate the effect of mutual inductance. This caused the generator to follow the v.-a. curves during transients, but had no effect on the slope of the v.-a. curves themselves. The new design is said to meet both requirements, with the advantages outlined by Mr. Hancock

ARADICALLY new generator principle for arc welding sets which lowers operating costs, reduces maintenance of equipment, increases the range of electrode sizes and thickness of materials, and provides convenience and safety to the operator, has been developed after two years of intensive research.

Operating costs in welding consist principally of (1) pay for the welding operator, (2) cost of electrodes, and (3) cost of electricity. The new principle applied to welding sets reduces all three of these costs per pound of weld metal laid down.

The method of reducing the payroll cost in welding is by improv-

ing the stability of the arc through producing a generator having a volt-ampere curve such that the current is much more nearly constant as the arc length changes. In Fig. 1 the composite curve A shows the average volt-ampere curve of a number of leading American welding generators. Curve B, Fig. 1, is the volt-ampere curve of one of these new generators. It can be seen that when the generator is adjusted for a given voltage and current, then the current will stay much more nearly constant over the entire welding voltage range from short circuit to the highest welding voltage when this new generator is used. This improved constancy of current assists

in making a more stable arc, and in reducing spattering of metal, so increasing the rate of deposition with a given current setting. The reduction in short circuit current for a given welding current that is achieved by the use of this set results in less tendency of the electrode to stick, and so expedites striking the arc. Therefore the new type set, by means of this greater constancy of current, results in less payroll cost per pound of weld metal deposited, due to the greater ease of striking the arc and the better arc quality and reduction of spatter when welding.

This same reduction in spatter resulting from the improved volt-ampere curve causes, in turn, an increase in the deposition efficiency. A larger percentage of the electrode melted goes into the weld, and less goes elsewhere. This reduces the cost of the electrode used.

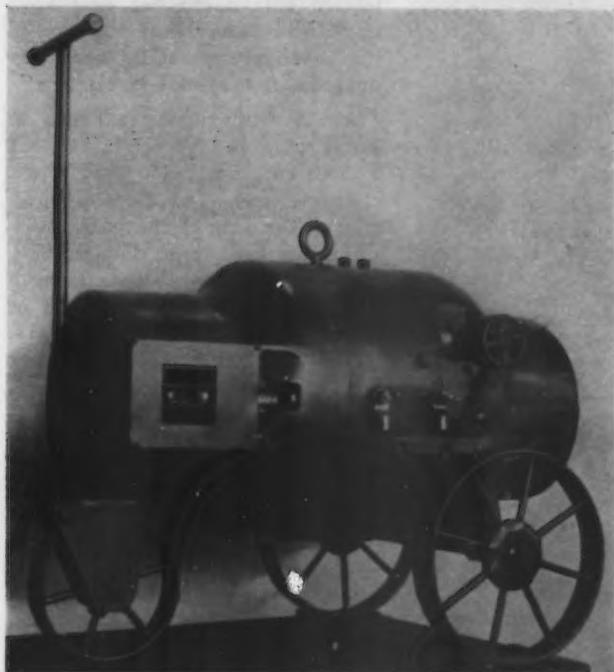
Cost of electricity consumed is reduced by reason of the reduction in no-load losses of the generator. By referring again to Fig. 1, it can be seen that the no-load voltage of this new type of set is much lower than that to which the welding industry has been accustomed. This low voltage is a result of a reduced excitation, which gives smaller field coil I^2r losses, and the iron losses in the generator decrease much more rapidly than does the voltage.

In addition to this reduction in losses, all exciter losses and all field rheostat losses are eliminated. This type generator, then, saves

power through having reduced losses when idling.

Fewer Parts Make for Lower Maintenance

This new welding set should have lower maintenance costs due to reduction in the number of parts, and to improved mechanical construction. Obviously, omitting certain parts will eliminate the maintenance expenditures normally due to those parts. No exciter, reactor, voltmeter, ammeter, meter switches, ammeter shunt, field rheostat, series field adjusting means, field discharge resistance, nor contactors are employed, and maintenance should be correspondingly reduced.

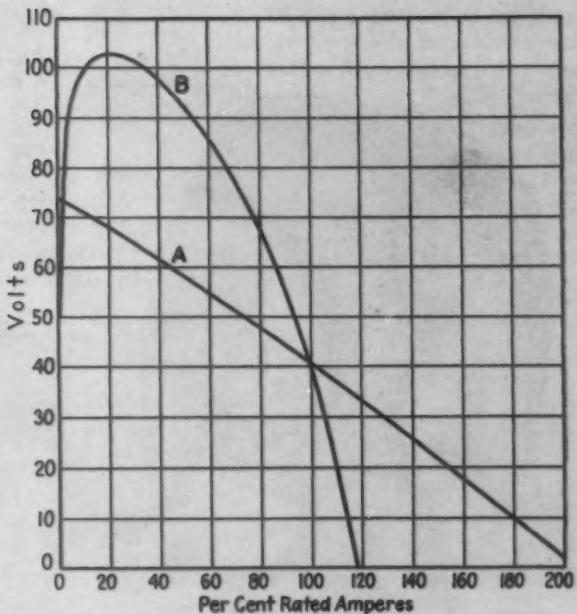


Furthermore, the number of parts in the generator itself has been reduced. Field pole coils have been reduced from the usual eight or 10 to four, with a corresponding reduction in the number of connections, and the remaining coils and connections are such as will carry the full armature current. All the coils using the smaller wires and lighter connections have been eliminated.

The mechanical construction of this machine should further reduce maintenance costs. Some of the factors contributing to this are as follows:

Construction of the set is exceptionally sturdy. The "armor clad" frame, employing no superstructure, can stand an abnormal amount of abuse without damage. The shaft is unusually short be-

AT RIGHT
FIG. 1—The volt-ampere curve at A is a composite, and the curve at B is that of one of the new Flex-Arc cross field welding generators.



AT LEFT
FIG. 2—Cross field welding generator equipped with three-wheel running gear, giving low center of gravity and short turning radius. Current is adjusted by the hand-wheel, and the setting is indicated on a large dial visible through a window in the frame.

tween bearings and unusually heavy. This, in conjunction with excellent balancing, and the rigid construction of the frame, give a minimum of vibration, so reducing maintenance costs due to vibration. No superstructures are built on the set. This reduces chances of being damaged.

An improvement is expected in the life of the electrode holders when this new set is used. Particularly on heavy-current welding it has been observed that failures of electrode holders are usually due to burning of the tips of the holder caused by repeated accidental touching the tip of the holder to the work or ground. The amount of this burning is dependent on the value of the short circuit current flowing. Since, as shown in Fig.

(CONTINUED ON PAGE 106)

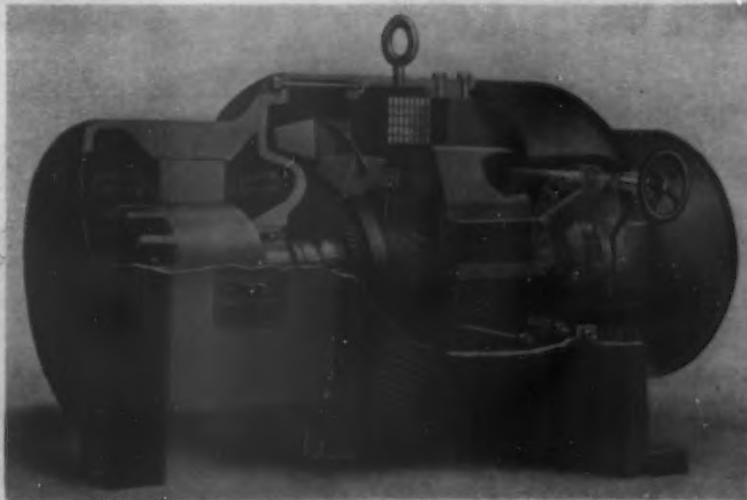
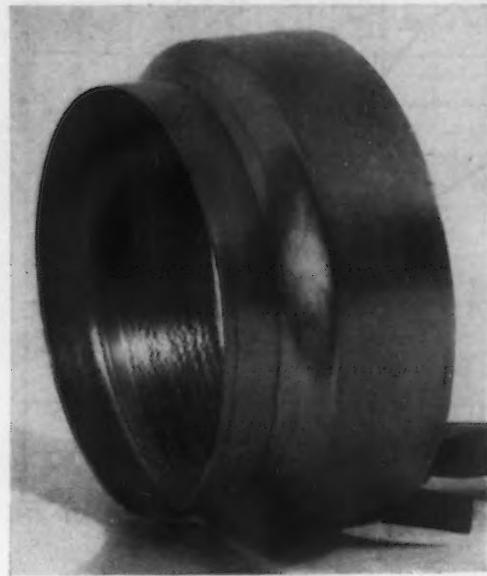


FIG. 3—Cut-away view showing construction of cross field welding generator, a two-pole machine with only series excitations. Simplicity, with elimination of meters and other parts, is a feature.

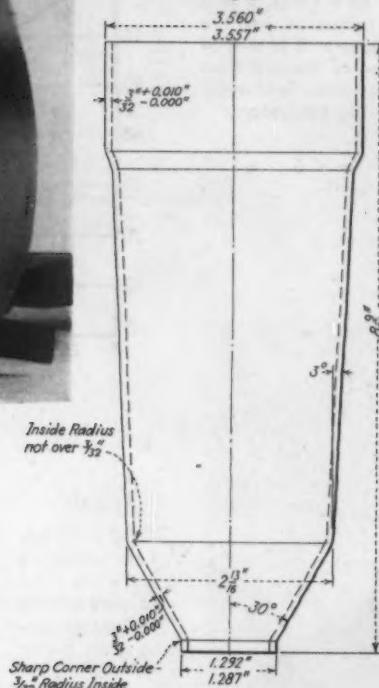


Unusual Spinning Job

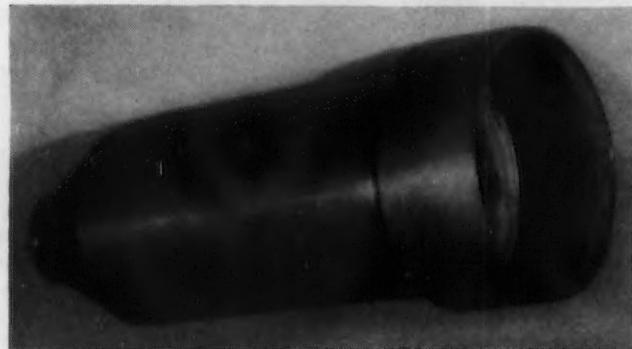
SEVERAL unusual metal spinning jobs have recently come from the shops of the Milwaukee Metal Spinning Co., Milwaukee. One of these is an injector sleeve which is not only of unusual design as spun jobs go but tolerances were held unusually close. This part was made from 0.107 in., cold-rolled, annealed copper. It was made from a 12-in. disk and all dimensions were held on a spinning lathe. Its outside dimensions are

FIG. 3—This stainless steel ring has two straight sides.

FIG. 2—Dimensions and tolerances are exacting on this metal spinning job.



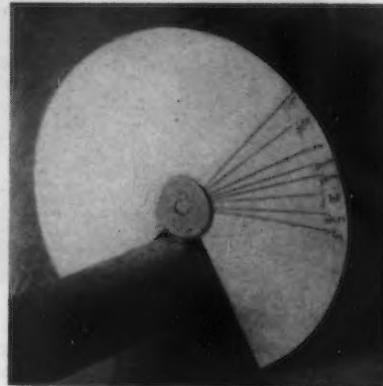
AT RIGHT
FIG. 1.—This diesel engine injector offered a real test for the metal spinner.



Iron Pipe Size Gage By A. KENDALL

THE gage illustrated was constructed by the writer and is, perhaps, the only one of its kind in existence. The purpose of the device is to determine the size of iron pipes quickly when the inside diameter cannot be reached, such as pipes with fittings attached or erected.

The gage is made from two pieces of sheet metal connected by a pin and two washers so that both halves can turn on the pin in the same



8 9/32 in. long by 3.557 in. plus 0.003 in. diameter at the largest end. An angle of 3 deg. had to be held on a side length of over 5 in. and the 30 deg. angle near the base was highly important when fitting the injector into a Diesel engine casting. Tolerance on the wall thickness at the top was plus 0.010 in. and the same allowance was made on the 3/32 in. metal on the truncated cone section near the small end. When inserted in the engine casting this injector is held in place by rolling two beads on the 3.557 in. diameter and by rolling over the edge on the 1.287-in. diameter on which the tolerance was plus 0.005 in. In this particular case spun metal was an advantage because of the beading and rolling necessary to secure the injector in place.

Another interesting example of metal spinning is shown in Fig. No. 3. This ring was made from 20 ga. stainless steel. Two sides are parallel to the axis of the part. Measurements are: large diameter 7 1/4 in., small diameter 6 1/8 in., length overall 3 3/16 in., and length of straight sides, 1 1/4 in. and 13/16 in.

manner as a pair of firm joint calipers. To mark the sizes on the gage, sample pieces of pipe were used with lines and figures etched and filled with black.

To find the size of any pipe up to 3 in., which is the largest we use, the gage is pressed down until the washers touch. The edge of the blank half of the gage will then be in line with the size marked on the other half.

White House Food Cabinet Is Made of Stainless Steel

A NEW application of stainless steel is found in the manufacture of food cabinets or thermotainers, one of which, of special design, has been built for installation in the White House by the Waters-Genter division of McGraw Electric Co., Minneapolis.

This unit, which is portable, will be used for taking prepared meals to the executive office for President Franklin D. Roosevelt and his guests. The cabinet will keep foods hot by electricity and cold by dry ice, and if the food is not served immediately, it is stated that it will be kept hot or cold for several hours.

In addition to the portable unit the company is building a large compartment-type thermotainer of heavy gage stainless steel, which is to be installed in the White House kitchen. Food when placed on platters and deposited in this storage cabinet will remain hot and savory, thus relieving the kitchen staff of the last-minute rush to remove food

from ranges and roasting ovens. This cabinet will be capable of serving a state dinner to more than 150 guests. Enduro stainless steel is used in the construction of this cabi-

net. This is a product of the alloy steel division of Republic Steel Corp., Massillon, Ohio.

The photograph shows the portable cabinet that has been built for the President being used for serving a test meal to H. C. Genter, left, and G. M. Waters, vice-presidents, and F. H. Emery, sales manager, Waters-Genter division, McGraw Electric Co.



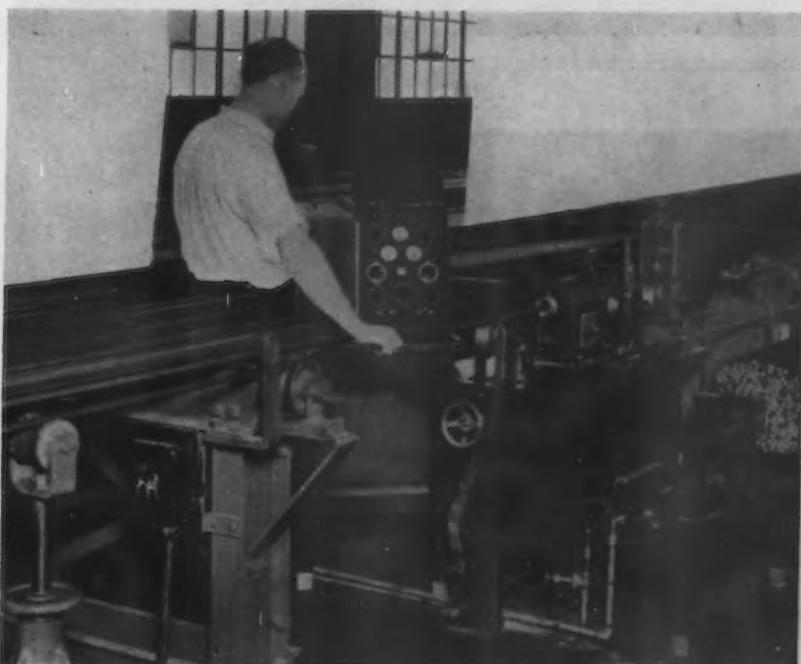
Bars and Tubes Tested Magnetically

A RECENT development in magnetic testing is the improvement of apparatus for high-speed

production inspection of both bar stock and tubing for mechanical defects, chemical analysis and heat

treatment. Continuous inspection at speeds as high as 150 ft. per min. has been attained through the simultaneous use of two test circuits having distinctly different yet supplementary characteristics, through the utilization of instantaneous as well as delayed acting signals and through the substitution of a new type a.c. galvanometer for the more cumbersome oscillograph devices used in older instruments. Such an installation is shown in the accompanying illustration.

This instrument made by the Magnetic Analysis Corp., New York, has two test circuits which consist of two alternating current compensating networks, one of which permits a comparison of the magnetic and electric properties of the unknown specimen with a hypothetical standard of known value (standard method) and the other a comparison in which the test specimen acts as its own standard (special method). The standard method is used to check changes in analysis and heat treatment and the special method is arranged in such a manner as to detect mechanical defects exclusively.



AT LEFT

CLEVELAND, Ohio.—A mammoth exposition, depicting the romance of iron, steel and machinery and covering approximately 80 acres of Cleveland's downtown Lake front, will be staged next summer in celebration of the city's centennial. Known as the Great Lakes Exposition, it will last through July, August and September of 1936 and will draw upward of 4,000,000 from all parts of the country.

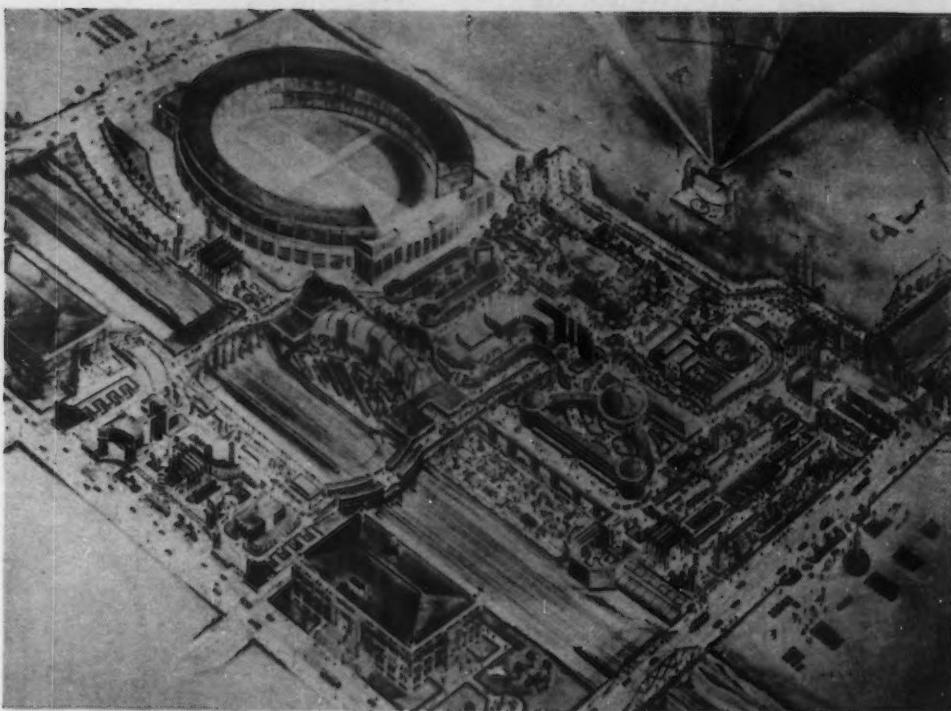


Photo from Wide World Photos

THE stretcher here illustrated, part of the hospital equipment of a large steel company, has been especially designed to travel over rough ground, across tracks, and in and out of buildings with a minimum of jarring. This is accomplished by means of ball bearings, balloon tires, and swivel-type casters, which make for easy and smooth steering. The equipment is provided with an army-type stretcher which is taken off the superstructure and placed on the ground near the injured man and lifted back on with him. The horizontal tension springs on which the stretcher is supported are used to provide easy riding.



AT LEFT

TWO of the first four 115,000 hp. hydraulic turbines which Allis Chalmers Mfg. Co. is building for the Boulder Dam power plant. The two units shown are the first to be assembled on the company's erecting floor. These turbines measure 55 ft. across and each weighs 1,250,000 lb.



AT RIGHT

THE huge, gear-shaped rotunda of the Ford exposition building at the 1934 Chicago World's Fair is being reerected opposite the Ford administration building as the visitors' entrance to the Ford Rouge plant at Dearborn, Mich. Limestone has been substituted for the world's fair plasterboard in the walls of the permanent building, the steel of the framework remaining the same, with the addition of enough for a second wing added to the one of A Century of Progress days. One thousand tons of structural steel are being put into the building, which was to be completed late in November. The Ford administration building can be seen through the network of beams and girders. Many interesting exhibits from the Chicago show will be preserved in this building, which is being erected by the R. C. Mahon Co., Detroit. The structure will rise to a height of 110 ft.

• • •

BELOW

IN a small workshop in the DeSoto body plant in Detroit, Frank Ryan creates all of the paint stripe "guns" used on Chrysler-made cars. He has perfected at least 25 different types since he started development work 12 years ago. He holds patents on all of his "guns." Here he is at his work bench with some of his latest models.



BELOW

THE illustration shows one of two welded pressure tanks which were fabricated in the Chicago plant of Chicago Bridge & Iron Works. These tanks are 12 ft. in diameter by 104 ft. long.

They are entirely of butt-welded construction. Joints were X-rayed.





Improvements in Production

New Ram Type Turret Lathe Features Fast Automatic Manipulation

BUILT-IN automatic devices effective without the operator taking his hand from the pilot wheel, feature the automatic indexing and clamping of the hexagon turret in a new ram-type turret lathe line by Gisholt Machine Co., Madison, Wis. A quick-indexing square turret on the cross-slide, arranged for carrying four tools, is automatically indexed and clamped by a forward and back movement of a lever. The ease with which an operator carries through all cycles of entire operations is stressed by the makers as featuring the elimination of lost operating time.

In the selective gear transmission employed, lever movements are to definite stops which require no close attention on the part of the operator but rather leave him free for close tool action observance. Three levers control the 12 available speeds. One lever splits the 12 speeds into two groups of six

speeds each, one high and one low. A second lever splits either selected group into two combinations of three speeds each, while a third lever singles out the particular speed desired. The shift from high to low, as from drilling to reaming or from turning to threading, is made through multiple disk clutches without stopping the spindle. A single lever controls the shifting from forward to reverse. When the lever is in neutral position, brake pressure is automatically applied to stop the spindle.

Splash oiling is employed in the headstock with the gears running in a bath of oil which carries to all bearings and moving parts at all speeds. Aprons are automatically oiled by a forced feed system which supplies a steady stream over gears and bearings. Hand pumps are supplied at the apron ends for lubricating the ways.

The new line is made up of three sizes. These cover bar stock from

1½ to 2¼ in., and range in chuck capacities from 8 to 15 in.

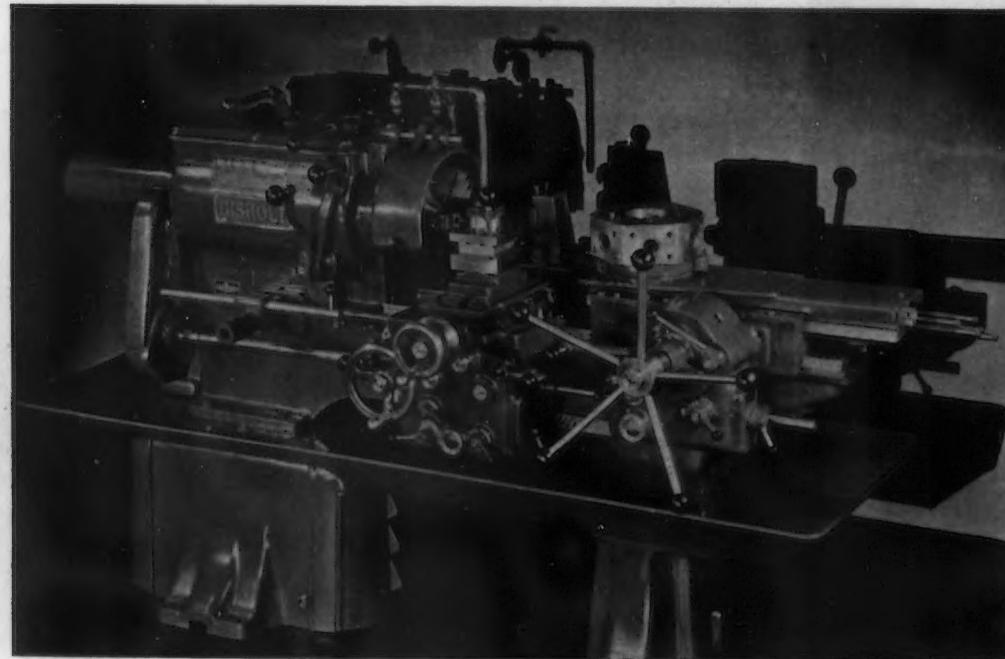
Tapered roller bearings and hardened alloy steel gears are provided throughout. The ways of the turret slide, saddle and bed are hardened steel, ground in position.

Floor Maintenance

FANKLIN RESEARCH CO., Philadelphia, announces an improvement in its "Rubber-Gloss" water emulsion, whereby floors may be damp-mopped an unlimited number of times without apparent effect upon or injury to wax film. Advantages to maintenance costs are stressed as fully demonstrated.

Roots-Connersville Blower Corp., Connersville, Ind., has added new smaller size unit, the 2½ by 7 meter, thereby extending its range of sizes of rotary displacement meters.

This meter is built for line pressures up to 25 lb. per sq. in., having a normal capacity of 5000 cu. ft. per hr. at 1 in. water gage differential, but maintaining commercial accuracy on loads ranging from 10 to 150 per cent of normal rating.



FAST manual gear shifting, to definite stops and through built-in devices, for desired speed selections is a feature of this new turret lathe.

on and Shop Equipment . . .



Predetermined Speed Selections Operative Through Single Lever

A CUTTING speed pre-selector for machine tools has been announced by the Warner & Swasey Co., Cleveland. It provides for shifting gears and for actuating the forward and reverse clutch. A built-in cutting speed selector and a speed sequence indicator are featured. A single lever operates not only all of the gears but also the start and stop and reverse clutch. The unit can be operated while the machine is running. In this calculator, the full range of work diameters is arranged on the left and right hand side of the window. The drum which rotates inside the housing indicates the proper ft. per min. for each diameter in 12 vertical columns corresponding to the 12 speeds of the headstock. The speed sequence indicator consists of a top mounted castellated drum, into the side slots of which numerals are inserted to indicate the several consecutive speeds required for the work in hand. When set up, rotation of a hand wheel to numbered positions serves to pre-select the next speed; however,

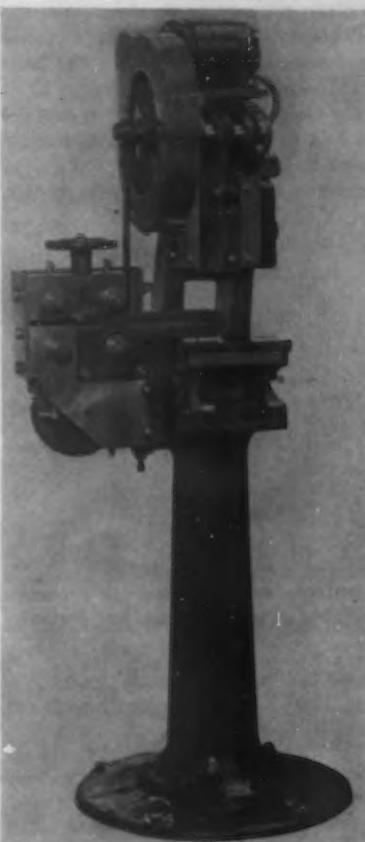
this speed does not become operative until a lever is pulled, immediately following completion of the preceding operation.

The purpose of the device is obviously to eliminate the human element in constant speed selections, by means of predetermined selections and to provide a normal working position for the operator.

High Speed Press Has Special Roll Feed

THE pedestal mounted, high-speed, automatic press illustrated is being marketed by E. W. Bliss Co., Toledo, Ohio. The design particularly features accessibility and saving in floor space. The press is self-contained through being direct geared to a 1½-hp. motor, driving the flywheel at a speed to give 700 strokes per minute. The automatic feature is

obtained by a special type roll feed mounted on the left end of the bolster. The feeding mechanism of the roll is actuated by a bellcrank on the flywheel end of the shaft. The bellcrank has a screw adjustment which gives a varia-



LITTLE space is required for the setting up of the high speed press referred to at the left.



PRE-SELECTED speeds are made available by single lever movement in a gear shift mechanism for machine tools. The illustrated head mounting is in connection with a turret lathe application.

tion in the amount of feed from zero to 1 in. A hand wheel provides for positive adjustment of the tandem roller mechanism.

Hickman Williams & Co., sellers of ferroalloys, pig iron, coke and coal, have opened an office at 30 East Forty-second Street, New York, in charge of Norman E. Craig.

Crane With Auxiliary Hoists Serves Refinery

BECAUSE of the special requirements in the smelter of a large copper refiner, a crane of rather unusual design, especially as to the trolley was required. This trolley is provided with two auxiliary hoists, each of 25 tons capacity, whose hooks are located the same distance on either side of the main hoist hook. The main hook handles, by means of a yoke, a 45-ton load of molten copper.

The auxiliary hoist is used to tip the ladle when it is filled with molten copper, or to tip it when it is empty. Owing to the furnace and pouring requirements, the ladle has to be poured either way, as it is a single lip ladle, and therefore it has to be swiveled on the main hook and then either auxiliary hook handles its part of the program, as is desired.

All of these hoists are of the Tiger



design, using herringbone gears and running entirely in oil.

Since this crane is in the smelter, both the electrical and mechanical parts are dust-proof and fume-proof. The crane was built by the Whiting Corp., Harvey, Ill.

New Power Hack Saw

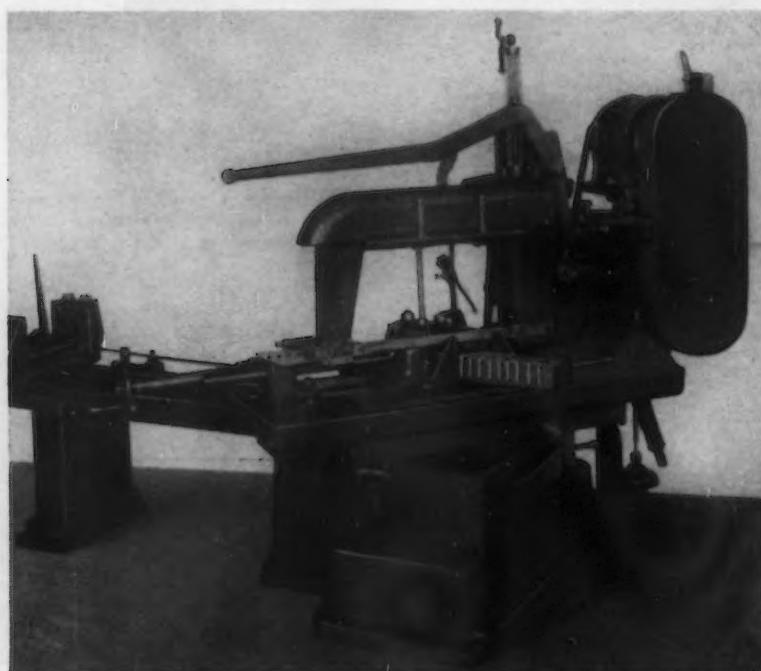
THE development of an automatic power hack saw with swivel features for angular cutting is announced by Rasmussen Machine Co., 1014 Eighth Street, Racine, Wis. Illustration below. Controls are provided for either a single automatic cut or for any

predetermined number of automatic cuts, straight or angular.

For angular cutting the machine is swiveled on its base to any dial setting and the vise is swiveled to a like dial setting. Thus there is no regulating required for the position of the automatic stock carrying mechanism.

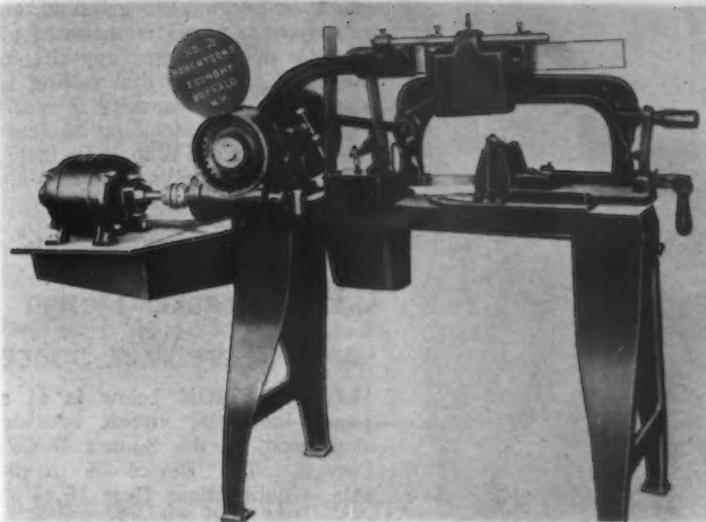
In automatic operation a trip

throws in a clutch for stock-gripping and forward feeding. At the completion of the predetermined stock feed the clutch is automatically thrown out, after which interlocked mechanism provides that, if the feed has been properly completed, the down feed of the blade commences. The blade feed, to the beginning of cut, is through rack and pinion. A compensating spring mechanism, and frame-feed against the resistance of oil in a dash-pot, are controlling factors in rate of feed. Protection against blade abuse is provided. Cutting is on the draw stroke after which the frame is cam-lifted, and through cam operation returns to correct position for the next draw stroke. This cam movement releases the vise preparatory to automatic stock feeding. The turning of one knob disengages automatic action and provides for hand operation.



Light Metal Working Outfit For Home Use

MALL workshop production of household articles and models or samples from light gage sheet metal is provided for in a line of equipment built and marketed by Glascock Bros. Mfg. Co., Muncie, Ind. The equipment consists of a small electric spot welder, operated from a light socket; a universal metal former; combination pan and box brake, with many accessories; a metal jig shear and a portable paint spray outfit, with a complete spray booth. Utility of the outfit extends to tin and repair shops, garages and training schools.



The treadle mechanism has a large tubular cross member which resists torsion or twist. This member extends across the full front of the shear for convenience.

Speed Reducer with Top Mounted Motor

A SPEED reducer consisting of a combination of spiral bevel gears and continuous tooth herringbone gears with motor mounted on top, as shown in illustration, has been placed on the market by the D. O. James Mfg. Co., 1114 West Monroe Street, Chicago. The arrangement is emphasized as providing a unique

Clutch Eliminated in Power Hacksaw Control

IMPROVED control for its No. 2 power hacksaw is being featured by W. Robertson Machine & Foundry Co., Buffalo, N. Y. The machine is shown above. Clutch mechanism is eliminated. The motor is connected to a worm shaft through a smooth-type flexible coupling. In the control mech-

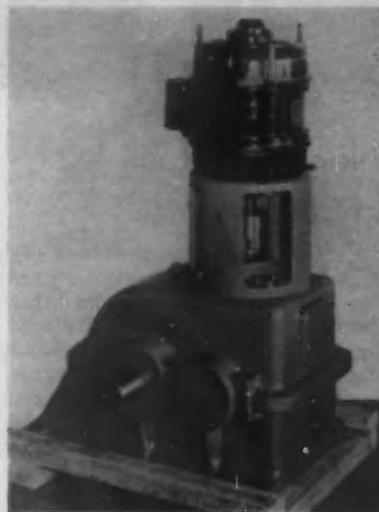
anism, a projecting finger contacts a push-button type switch and stops the motor as well as the frame.

The worm gears are fully enclosed and run in an oil bath. Hydraulic lift, of a safety type, is employed. The vise swivels to 45 deg. for angular cutting.

Squaring Shears for 16-Gage Metal

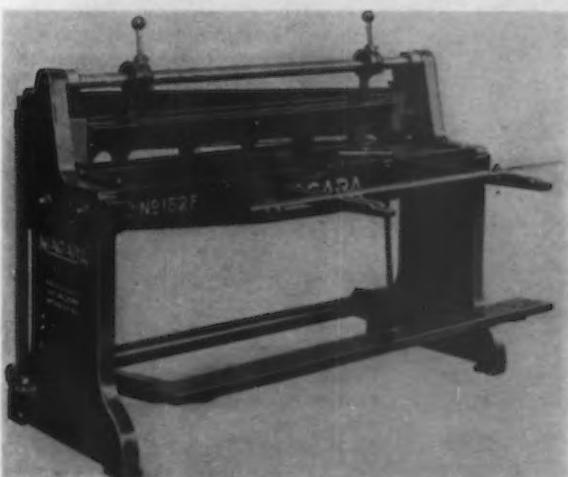
A COMPLETE line of new, series F, foot operated squaring shears for 16-gage metal, is announced by Niagara Machine & Tool Works, Buffalo, N. Y. One piece, closed panel, high tensile cast iron housings are recessed at the center for convenience in handling sheets. A new steel holdown is manually operated through self-locking eccentrics

which maintain heavy pressure over the entire length of cut. A steel cross head provides rigid backing for the knife, and moves in flat ways with adjustable gibbs. The back gage is adjustable without wrenches. On the 96 and 120 in. length shears, a patented parallel screw adjustable back gage has a graduated steel scale and a lock pin for each index plate.



horizontal drive, occupying a minimum of floor space.

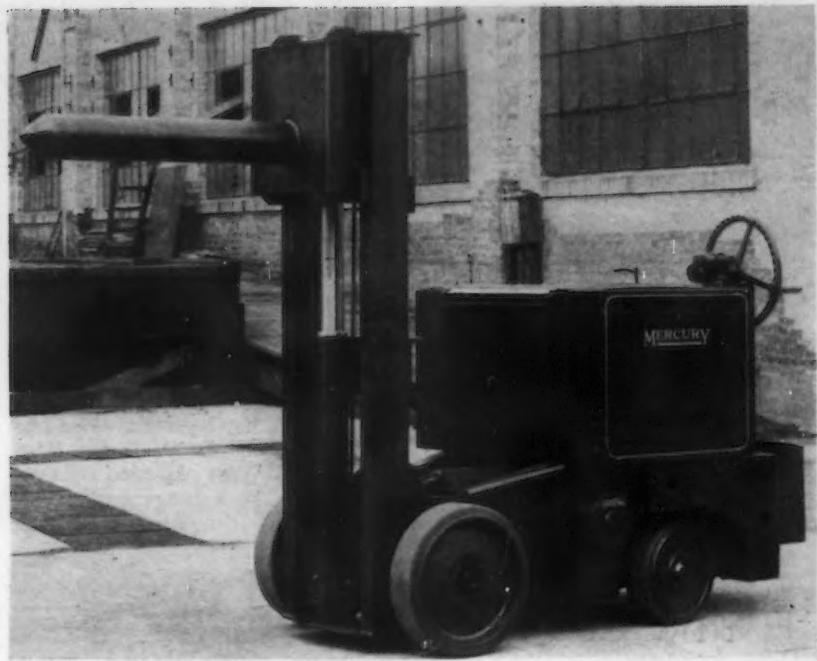
Timken tapered roller bearings are used throughout. All bearings and gears are lubricated by force feed, with oil plunger pump submerged in the oil inside of case. A complete range of sizes has been developed, with horsepowers from 1 to 200 hp. Ratios range from 8 to 1 to 45 to 1 and higher.



• • •
A COMPLETE line of the illustrated squaring shears is available with hp. range from 1 to 200.

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BEARING surface protection in all manufacturing and assembly operations from foundry to journal box installation is provided by the use of a conveniently handled clamp-on cover manufactured by the Lewis Bolt & Nut Co., Minneapolis, Minn. Design and construction are such that the device can be used at any stage of production or storage and reused over and over. The makers stress the point that this "Macer" device eliminates hot boxes caused by damaged bearing surfaces as surface impact is impossible because of the complete protection afforded.



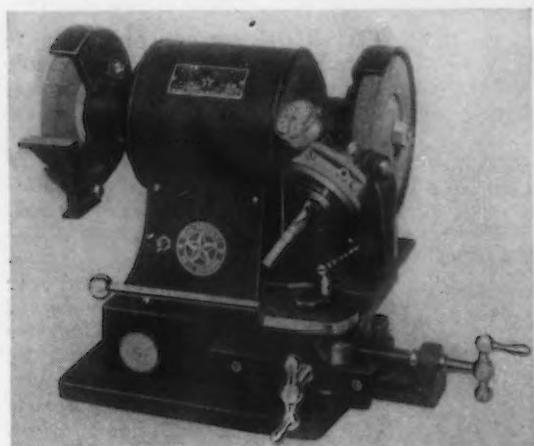
Non-Tilting Coil Lift Hydraulic Truck

A NEW type of Mercury "T.T.T." ram truck designed for handling strip steel and other material in coils has been developed by Mercury Mfg. Co., 4100 South Halsted Street, Chicago. The truck is illustrated above. It is a fixed type (non-tilting), high lift model with Mercury hydraulic lifting action, equipped with a ram for carrying a 4500 lb. load, handled by inserting the ram in the center of coils. An oversize battery com-

partment is provided to accommodate extra battery capacity, giving sustained speeds and permitting continuous operation over long periods. The lifting action is the Mercury hydraulic lift with inherent positive overload protection. Other features are double-reduction bevel and spur gear drive axle, semi-elliptic spring suspension, safety brakes in the wheels, ball bearing mountings throughout, and the Mercury magnetic contactor control. A safety feature for steel mill operation is the heavy steel-plate guard around the operator's platform. Vertical wheel steering is provided.

New Motorized Unit Drill Grinders

STAR MACHINE & ENGINEERING CO., Bloomfield, N. J., announces a new precision

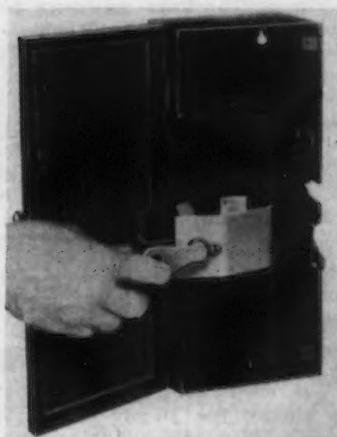


PRECISION drill grinding, done on the peripheral face of the wheel, features the motorized unit at the left.

coarse or preliminary grinding, an extra coarse wheel is mounted at the side of the motor opposite to the chuck. Simple dial setting is employed. Drill capacity is specified as 81 sizes, including 25 fractional drills from $\frac{1}{8}$ to $\frac{1}{2}$ in. inclusive, numbered drills from 1 to 30, and all letter size drills.

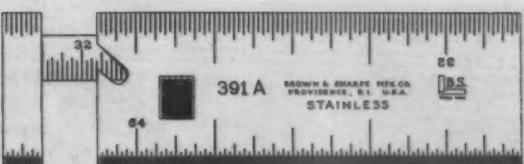
Circuit Breaker Design Gives More Wire Space

ILLUSTRATION below is of a new industrial circuit breaker announced by the Square D Co., Detroit. The device is available in calibrations from 15 to 50 amps., 250 volts a.c., 125/250 volts d.c., and 575 volts a.c., 250 volts d.c., in two and three poles. The new breaker features the company's design for separate mounting of the switch element on a



metal pan which is so hinged that it may be swung out of the box, permitting the box area to be utilized for bringing in conduit wires. Space is provided between the metal pan and the box interior for the running of wires without pinching and without damage to insulation. The operating handle is permanently engaged with the Bakelite breaker handle eliminating danger of breakage when the cover is being closed.

The annual meeting of American Engineering Council will be held in Washington, Jan. 9, 10, and 11. Headquarters will be at the Hotel Mayflower, where all meetings and the dinner will take place. Committees will hold preliminary meetings on Jan. 9, in the Pan American room and the Seventeenth Street parlor. The assembly-administrative board will meet Jan. 10 and 11, in the Chinese room. Frederick M. Feiker, 744 Jackson Place, Washington, is executive secretary.



Stainless Caliper Rule Has Lasting Finish

Na 3-in. caliper rule announced by the Brown & Sharpe Mfg. Co., Providence, R. I., stainless steel provides a lasting finish and

easily read graduations. Corner markings are in 8ths., 16ths., 32nds., and 64ths. Slide markings are in 32nds., and 64ths. of an in.

Swing-type Sandslinger Has Robot-Actuated Ram

ENTIRELY automatic molding is specified for production foundries employing a new sandslinger announced by Beardsley & Piper Co., Chicago. The equipment is illustrated below.

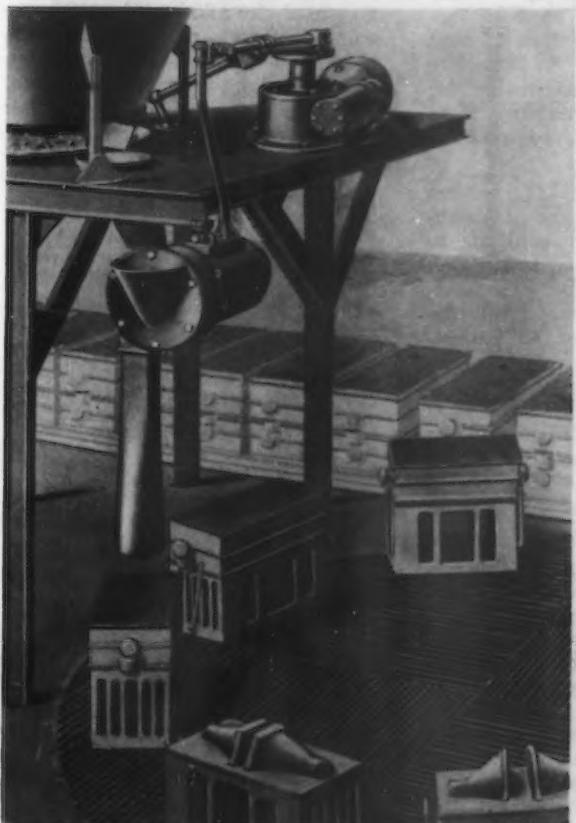
The assembled unit provides a swing-type sandslinger mounted on a superstructure and fed by a suitable sand supply. The ramming head is actuated by a robot which has an adjustable movement in any direction, from a straight line to a full circle. The ram is suspended by a universal swivel joint at the top. The ramming action is over any predetermined area of size,

depth or flask shape and is said to provide complete density control.

Coil Reel Features

Automatic Arm Control

WITTEK MFG. CO., Chicago, has announced a patented automatic, self-centering coil stock reel. Four automatically expanding coil holders slide on radial arms by means of gear-rotated auxiliary threaded shafts. Movement of the arms is effected by rotating the reel to right or left with the gears



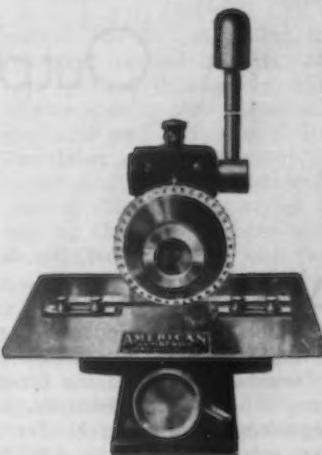
ENTIRELY automatic molding in production foundries is the design aim of the swing-type sandslinger shown at the left.

AUTOMATIC adjustability of coil supporting arms is a feature of the coiled-stock reel at the right.

in mesh. The gear mechanism is inclosed. The four coil holders are always at equal distance from the center. The holder is adjustable to any angle from horizontal. Height is adjustable. Coil capacity is up to 500 lb. Open centers may be from 9 to 28 in.

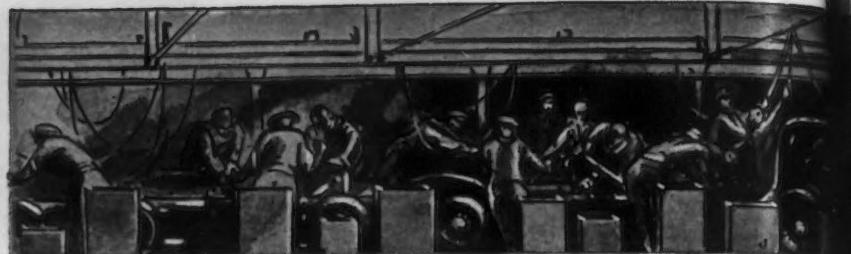
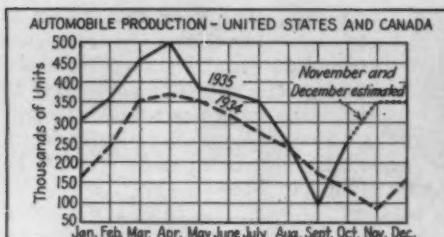
Metal Marking Machine With Automatic Feed

COMPLICATED as well as plain numbering and lettering are produced rapidly on a new numbering device announced by



the American Numbering Machine Co., Brooklyn, N. Y. By means of a revolving dial any single figure or letter is brought into impression position. A single lever stroke produces the impression and revolves the dial to the next required character. The same motion advances the impression table an even space. The machine is designed particularly for numbering nameplates and like parts.





THIS WEEK ON THE

Output For Year Likely to Be Four Million Units

DETROIT, Dec. 3.

AUTOMOTIVE production wheels are turning at full speed as the industry enters the final month of the year. Output in fact, has surpassed the fondest hopes of car manufacturers, and it appears that final figures for the year actually will top 4,000,000 units.

To everyone's surprise, October's assemblies amounted to 283,334 cars and trucks (which meant that Ford built around 68,000 units that month), bringing the total for the first 10 months up to 3,349,790 units. Production during November and December is conservatively put at 350,000 each month. That boosts the year's volume slightly over the four-million mark.

Pouring huge sums into advertising and promotional campaigns the past month and with the automobile shows further to enhance the public's interest, the industry has made an enviable record in retail sales. Chevrolet, for example, has revealed that its dealers sold 60,707 units in the first 20 days of November, the best record for the first two reporting periods for any month since April, 1930. While sales figures for the entire month aren't yet compiled, November retail deliveries were by a wide margin the greatest for that month in Chevrolet's history.

Pontiac sold at retail 8566 cars in the first 20 days of November, compared with 3764 cars in all of November a year ago. Buick's deliveries for the same period were 8242 units. From Oct. 1 to Nov. 20 Buick, which introduced its new line on Sept. 28, sold at retail 22,410 units. It's no wonder that

Buick executives have broad smiles these days.

Production is being maintained at an unprecedently high rate for this time of year. Chevrolet's assemblies last month were in excess of the 100,000 units originally planned. On Nov. 22 the company attained a new high mark for a single day's production of 1936 models when over 6000 cars rolled off the lines. Plymouth is reported assembling 2200 cars a day and 2500 motors, thus adding a small number daily to the bank of motors stored in anticipation of next spring's peak season. It is said to have on hand unfilled orders for 100,000 cars, thus enabling it to operate at full capacity until at least early February.

Ford is reported making around 5000 units a day. Dodge, Oldsmobile and Pontiac each continue to build 1000 units daily and Buick 800. The Chrysler-De Soto division of Chrysler has been the slowest getting started, but its volume is gaining. Reo, with a million-dollar order from the Department of Agriculture for 1199 trucks, is busy. Cadillac-La Salle has doubled the quota which it earlier set up for December. Packard shows no slackening of its record-breaking pace.

Used Car Problem Serious

While juicy sales reports are being dropped into the automotive news pot by almost all companies, sales executives are sitting up nights trying to lick the used car problem staring them in the face. There is no getting away from the fact that fall introductions impose on dealers the load of carrying used

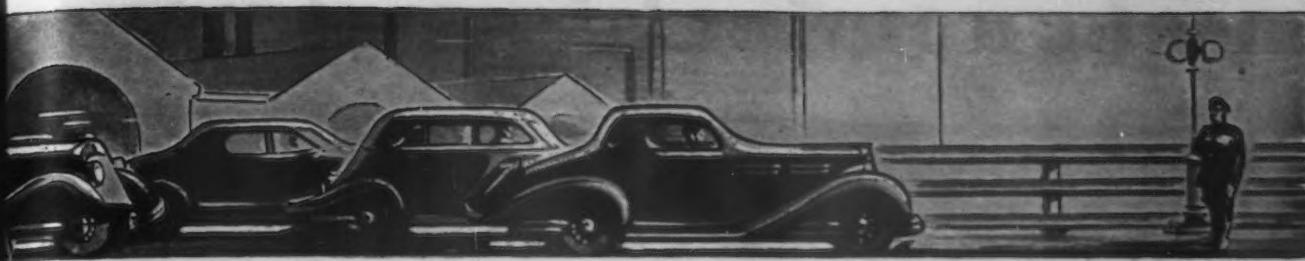
cars through four winter months, whereas with January announcements the time was reduced to two months. Factory executives have been hammering on the point that dealers must avoid wild trading and be extremely careful what kind of used cars they take in unless they want to be stuck for four months with an unsalable product.

Despite repeated warning from car manufacturers, dealers are currently letting themselves in for plenty of trouble by making excessive used car allowances. It is the opinion of well-informed observers that some dealers who have been treading along the ragged financial edge are likely to lose their balance and topple over the precipice during the winter, too large used car stocks being the unbalancing factor. Moreover, the industry won't be surprised if the production volume by factories is held down somewhat in January and February by the inability of dealers to handle more than a limited number of sales because of burdensome stocks of "trade-ins."

Dealers are realizing, however, that a considerable market exists for used cars selling at \$200 to \$250. Buyers consist mostly of factory workers who must have some kind of car for transportation to and from their jobs. These people aren't particular about the appearance or age of vehicles so long as they run satisfactorily. In Detroit, for instance, there is a brisk demand from this class of used car buyer.

Large Steel Orders Placed

Motor car companies are still placing steel orders in large vol-



THE ASSEMBLY LINE

BY BURNHAM FINNEY

Detroit Editor, The Iron Age

ume. Some sheet mills report bookings so heavy that they cannot promise delivery on many sizes until late in January. On the other hand, the announcement that prices will not be advanced for first quarter has had a pronounced effect. Automotive steel buyers have suddenly discovered that they do not need huge tonnages quite so badly as they thought they did, telling mills it will be all right to ship certain orders in January or February instead of this month. Incidentally, Chrysler was understood to be planning on substantial speculative steel purchases, such as it made in 1933 and 1934 when prices went up, but abandoned the idea when prices were pegged at present levels.

Packard has not yet closed for equipment for tooling up for a new six-cylinder car to be introduced next spring. It probably will be another week before action is taken. How much will be spent on new machinery is a moot question, although it seems likely that the outlay will be substantial. It will be remembered that Packard took bids on far more equipment than it bought when it was getting ready to tool up its plant for the 120 job.

Aside from the pending Packard transaction, there is no outstanding piece of business in the equipment trade. Companies are still too absorbed in the first rush of production following the shows to pay much attention to replacement needs. The next move, of course, will be to survey production lines and decide on machinery to plug up weak spots. Delivery dates are continuing to play a prominent part in securing machine tool business. Many builders are losing orders because they cannot meet delivery requirements. On the other hand, this situation has made it possible for some companies heretofore hungry for work to get some overflow orders.

A prominent automobile maker is known to have perfected a Diesel engine for trucks to the point

where it may be ready for action in the next 30 to 60 days. Development of this engine has been kept secret, but those in a position to know state that the economical performance of the new unit is remarkable. When the engine is ready to be put into production, it will be built by the company rather than by an outside firm and a sizable tooling program will be necessary. It will be the first time that one of the "volume" truck makers has ventured into the Diesel field.

Difficulties Faced in Air Conditioning Cars

Much has been said about the possibilities of air conditioning automobiles in the next few years. Questioned on this subject, a well-known automotive executive recently cited some of the difficulties to be encountered. In the first place, a satisfactory unit must be designed which will not be too large or weigh too much. The trend is to eliminate rather than add parts. Secondly, the cost of an air conditioning unit would prohibit its use at first as standard equipment. The car owner would have to pay a tidy extra sum for it. Thirdly, some better system than now exists will have to be devised to keep carbon monoxide and other fumes out of cars before attempting to seal windows for effective air conditioning. Finally, there would be the problem of convincing people that they want windows closed and fresh air excluded after they have been educated for years by the automotive people to drive out into the great open spaces to "get a breath of fresh air."

What seems much nearer than air conditioning of private passenger cars is the air conditioning of buses which must compete with air conditioned railroad coaches. An air conditioning unit adaptable for buses and already tried out successfully is reported to be about the size of a small office desk and

weighs 600 lb. A gallon of refrigerant poured into its tank is said to last indefinitely, the refrigerant being non-poisonous, non-explosive and rating as a fire extinguisher in an emergency. It is understood that the Houde Engineering Corp. and Carrier Engineering Corp. have been working on an air conditioning unit for motor vehicles for some time.

Smaller Makers Active

Cadillac-La Salle is building 160 units a day, five days a week and is understood to have 10,000 orders on hand. Hudson is making over 700 cars daily and intends to maintain this schedule through the remainder of the year. Nash is on a schedule of about 1500 units a week while Lincoln is turning out 60 to 70 Zephyrs a day.

November pig iron shipments to automotive companies were 45 per cent higher than those in October, practically all of the tonnage having been melted almost as soon as received by consumers. The Pontiac foundry now is in production. It is expected that employment will be gradually increased to 800 men in the spring when the plant's capacity of 400 tons a day will be reached.

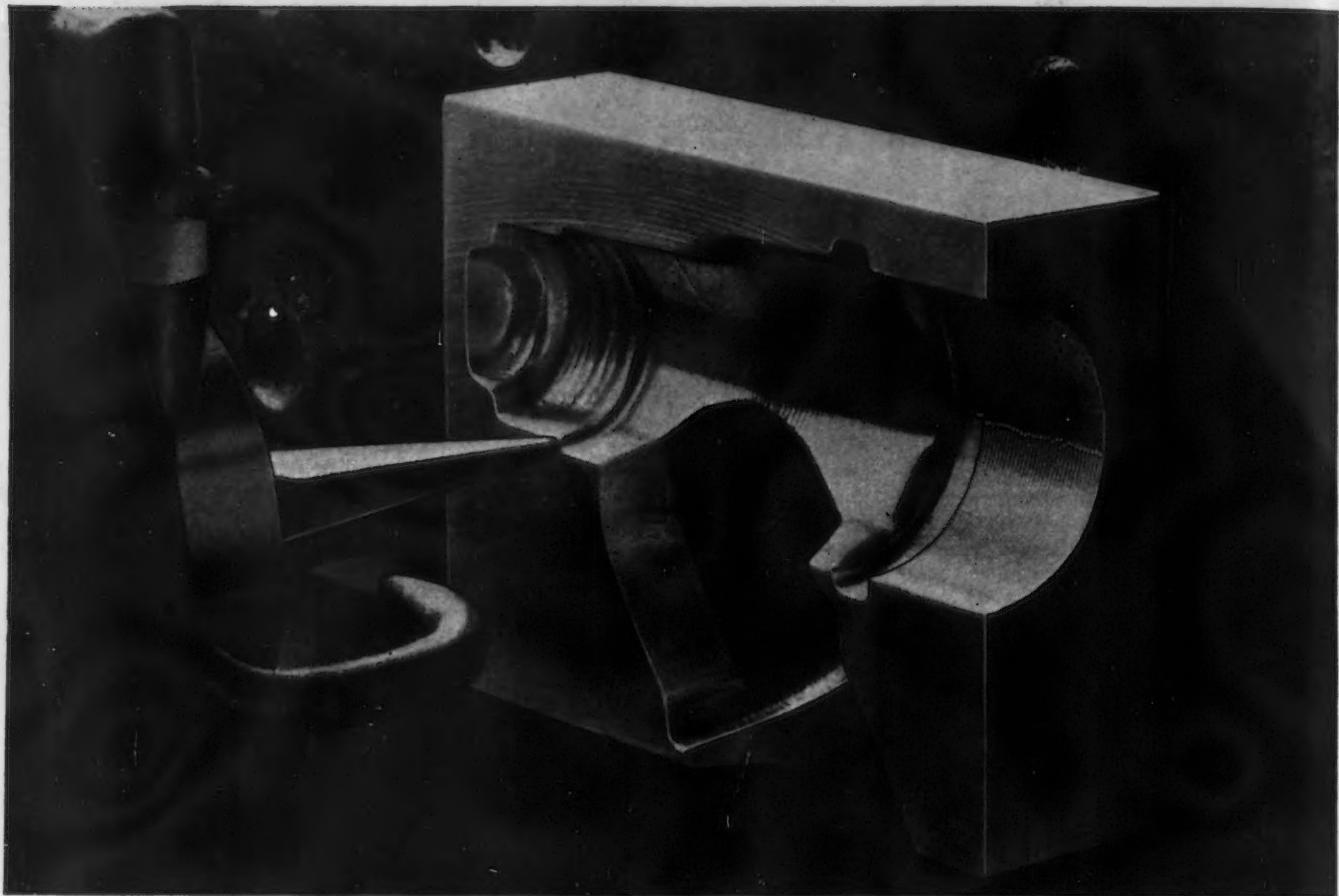
It is reported that plans have been completed whereby Reo will build light trucks for Mack which will sell them under its own name.

For sometime there has been an arrangement between the two companies whereby Reo trucks were sold by Mack's factory branches scattered around the country. Now Mack proposes to market light trucks made by Reo, but they will bear the Mack name. Mack will continue to confine its manufacturing activities to heavy-duty trucks.

In the last few years light trucks and tractor-trailers have made serious inroads on heavy-duty truck sales. In view of the operating economy as well as the lower

(CONTINUED ON PAGE 94)

An economical investment



This small automatic machine, the Keller Type GG, produces dies and molds in a manner which shows economies in any toolroom. Its range of 12" x 10" is sufficient to take care of the great majority of punch and die work and bakelite molds, as well as a fair share of die casting and forging dies.

It reproduces from molds of soft materials or from light, inexpensive sheet metal templates with all the precision to be found in any of the larger Keller machines. With the precision locating attachment, it may be equipped to locate plugs and to bore holes in progressive dies on the setup used for milling the impressions.

Its price is low enough to make it an economical installation for any toolroom. In size and weight it is small enough so that installation is possible under almost any conditions.

A large part of the manual skill required in other methods is built into this machine. With it you can limit highly paid tool making labor to the finishing of work. Impressions come off this machine closer to their final state than you ever believed possible. The large photograph above shows a bakelite mold for a two way electrical plug. Only a small amount of hand grinding is necessary to remove the feed lines left by the close parallel strokes of the end mill. Difficult shapes are no problem for this machine.

Automatic operation as practised by the Keller method is a safeguard against spoilage. Tools will be produced at estimated costs with none of the mistakes and delays that spell the difference between profit and loss.

Send for our circular on this machine. It is profusely illustrated and will show you exactly what it can do in your toolroom.

PRATT & WHITNEY Co.
HARTFORD, CONN. **KELLER DIVISION**

for any progressive toolroom
small.....
...or large



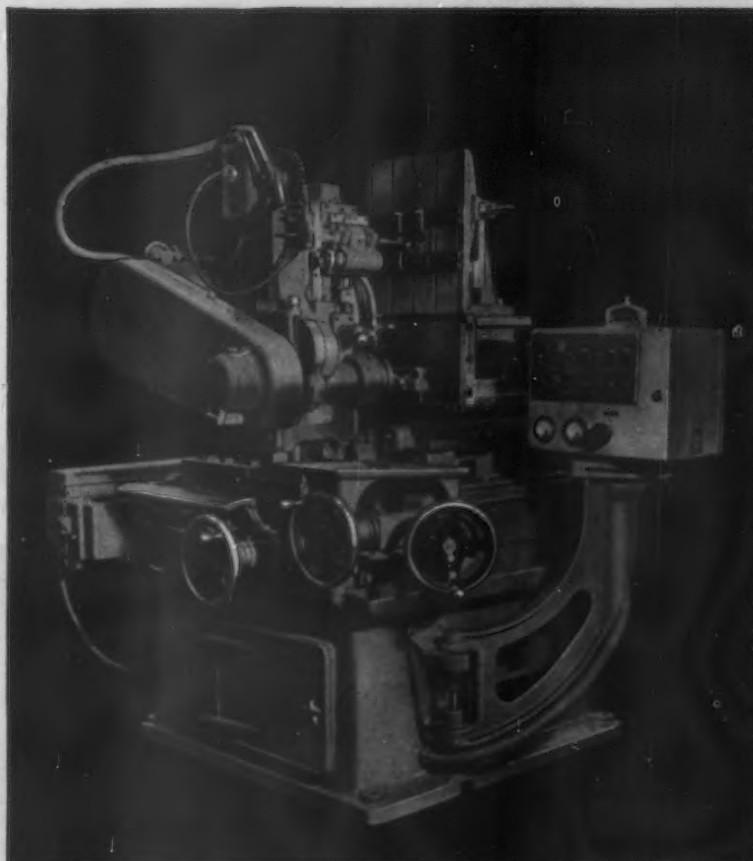
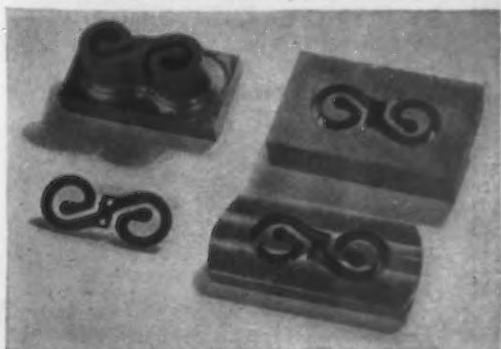
You saw it
in Cleveland



THE KELLER AUTOMATIC TOOLROOM MACHINE—Type GG

To the right is a full view of the Keller Type GG Automatic Toolroom Machine, showing the same job which is illustrated full size on the opposite page.

Below is an intricate punch and die job produced on the same machine. The master for the punch was a sample stamping. The template for the die was cast in type metal against the punch, thereby insuring an accurate fit. By relative sizing of cutter and tracer, the machine can be made either to reproduce exactly or to leave the punch or die oversize for a final shearing fit. The stripper may be cut oversize from the template used for the die.



Scrap Exports Lower—Steel Imports Higher

Exports (In Gross Tons)

	October	Ten Months Ended October		
	1935	1934	1935	1934
Pig iron.....	125	273	2,689	2,890
Ferromanganese.....	47	41	89	85
Iron and steel scrap.....	145,850	147,213	1,797,468	1,422,627
Tin plate scrap.....	2,108	...	32,759	...
Waste-waste tin plate.....	2,489	...	18,661	...
<i>Pig iron, ferroalloys and scrap</i>	<i>150,619</i>	<i>147,527</i>	<i>1,851,666</i>	<i>1,425,602</i>
Ingots, blooms, billets, sheet bars.....	1,609	5,069	36,804	14,280
Skelp.....	13,212	2,655	45,489	63,015
Wire rods.....	2,473	483	21,351	19,564
<i>Semi-finished steel</i>	<i>17,294</i>	<i>8,207</i>	<i>103,644</i>	<i>96,859</i>
Steel bars.....	6,176	3,133	45,013	33,924
Alloy steel bars.....	357	221	2,217	2,410
Iron bars.....	132	40	921	826
Plates, iron and steel.....	4,905	2,023	35,615	31,021
Sheets, galvanized steel.....	4,211	5,496	59,417	54,711
Sheets, galvanized iron.....	237	106	1,632	1,194
Sheets, black steel.....	6,646	6,140	83,220	71,147
Sheets, black iron.....	594	307	4,680	3,843
Hoops, bands, strip steel.....	4,803	1,646	36,984	23,729
Tin plate and taggers' tin.....	12,444	14,793	99,959	155,221
Terne plate (including long ternes).....	270	...	1,983	...
Structural shapes, plain material.....	3,649	2,946	28,488	28,132
Structural material, fabricated.....	874	2,653	17,762	17,405
Tanks, steel.....	401	1,205	5,095	5,934
Steel rails.....	1,511	2,053	39,552	58,110
Rail fastenings, switches, spikes, etc.....	699	570	8,074	14,601
Boiler tubes.....	793	703	7,607	6,657
Casing and oil line pipe.....	1,733	3,183	23,774	54,159
Pipe, black and galvanized, welded steel.....	1,920	4,260	28,320	37,698
Pipe, black and galvanized, welded iron.....	258	177	2,754	1,938
Plain wire.....	4,823	2,988	32,503	31,665
Barbed wire and woven wire fencing.....	3,671	3,117	27,739	32,116
Wire cloth and screening.....	95	56	878	835
Wire rope.....	196	257	3,300	2,321
Wire nails.....	1,041	887	8,981	11,140
Other nails and tacks.....	330	365	3,119	4,281
Other wire and manufactures.....	538	286	4,312	4,025
Bolts, nuts, rivets and washers, except track.....	538	394	5,386	4,124
Other finished steel.....	109	180	1,222	1,504
<i>Rolled and finished steel</i>	<i>63,954</i>	<i>60,185</i>	<i>620,507</i>	<i>694,671</i>
Cast iron pipe and fittings.....	2,780	2,253	15,090	14,192
Malleable iron screwed fittings.....	387	293	2,964	2,544
Carwheels and axles.....	1,543	566	14,114	4,976
Iron castings.....	855	491	7,520	6,062
Steel castings.....	164	304	2,299	1,994
Forgings.....	762	381	5,021	3,598
<i>Castings and forgings</i>	<i>6,491</i>	<i>4,288</i>	<i>47,008</i>	<i>33,366</i>
Total.....	238,358	220,207	2,622,825	2,250,498

Imports (In Gross Tons)

	October	Ten Months Ended October		
	1935	1934	1935	1934
Pig iron.....	17,168	6,082	99,098	105,773
Sponge iron.....	123	1	1,089	796
Ferromanganese and spiegeleisen ¹	6,540	2,190	41,668	25,601
Ferrochrome ²	7	1	74	74
Ferrosilicon ³	34	36	694	674
Other ferroalloys ⁴	11,129	2,009	38,371	32,326
<i>Pig iron, ferroalloys and scrap</i>	<i>34,994</i>	<i>10,925</i>	<i>180,922</i>	<i>165,290</i>
Steel ingots, blooms, etc.....	361	96	1,962	1,417
Wire rods.....	2,475	231	12,882	8,813
<i>Semi-finished steel</i>	<i>2,836</i>	<i>327</i>	<i>14,444</i>	<i>10,230</i>
Concrete reinforcement bars.....	76	17	2,580	1,138
Hollow bar and drill steel.....	141	60	1,001	676
Merchant steel bars.....	1,456	8,439	15,715	15,715
Bars, whether solid or hollow ⁵	2,448	...	11,578	...
Iron slabs.....	254	12	1,414	699
Iron bars.....	3	10	487	235
Boiler and other plate.....	1,939	523	9,461	3,998
Sheets, skelp, and saw plate.....	18	2	174	96
Tin plate.....	4,265	2,646	32,155	18,923
Structural shapes.....	225	...	225	1,109
Rails and rail fastenings.....	1,118	563	4,193	2,720
Welded pipe.....	678	267	3,857	1,569
Other pipe.....	1,295	298	13,679	2,563
Cotton ties ⁶	835	...	8,136	8,136
Other hoops and bands.....	1,741	1,739	17,709	15,037
Barbed wire.....	2,935	365	21,234	8,234
Round iron and steel wire.....	367	159	3,334	2,157
Telegraph and telephone wire.....	2	...	23	43
Flat wire and strip steel.....	214	151	1,492	1,409
Wire rope and strand.....	178	213	1,582	1,373
Other wire.....	212	62	1,095	684
Nails, tacks, and staples.....	2,640	367	17,322	6,095
Bolts, nuts, and rivets.....	6	19	239	213
Horse and mule shoes.....	18	12	509	320
<i>Rolled and finished steel</i>	<i>21,608</i>	<i>8,941</i>	<i>161,918</i>	<i>85,007</i>
Malleable iron fittings.....	...	...	46	...
Cast iron pipe and fittings.....	3	...	30	40
Castings and forgings.....	128	57	1,064	1,245
Total.....	59,569	20,250	358,824	261,812

¹ Manganese content. ² Chrome content. ³ Silicon content. ⁴ Alloy content. ⁵ New class. No comparable figures for 1934 or previous years. ⁶ New classification as result of the Reciprocal Trade Agreement with Belgium. No comparable figures for previous year.

RON and steel exports from the United States during October, at 238,358 gross tons, fell short of equaling the September volume by only 2.5 per cent, despite the lowest shipments of scrap iron and steel in months. The October volume also held at a level 8.2 per cent in excess of shipments effected during the corresponding month of last year.

A sharp 10,318-ton gain in skelp iron or steel shipments, aided by a substantial gain of 2794 in steel bars, and increases of 1000 tons or more in barbed wire, waste-waste tin plate, cold-rolled strip steel, plain wire, car wheels and axles, and tin plate and taggers' tin, in a large part offset the 24,636-ton decline in the iron and steel scrap total. In only two items—excepting scrap—did losses of 1000 tons or more occur, heavy rails, and black sheets.

Imports continued at a high level during October the 59,569-ton trade gaining 12 per cent over receipts during the previous month, which in itself was the monthly peak over the past two years.

Sources of American Imports of Iron and Manganese Ores

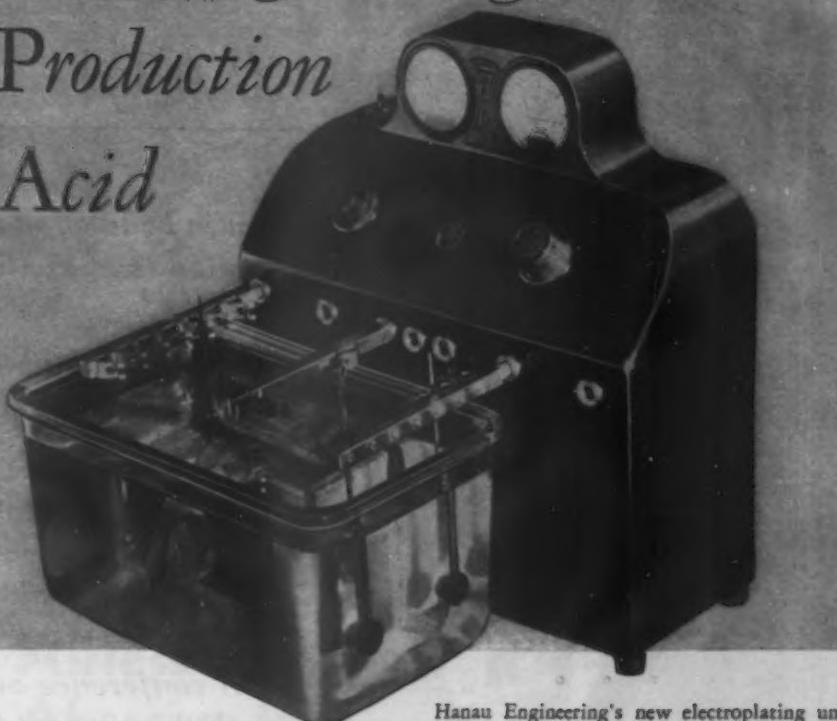
	(In Gross Tons)		October	
	1935	1934	1935	1934
Manganese Concentrates				
Iron Ore				
35 Per Cent or Over				
Canada	95			
Cuba	11,000	2,760		
Chile	65,400	66,400	654	
Spain				
Norway				
Sweden	8,884			
Russia	16,700	7,900	4,947	6,257
India	5,796	895		
Brazil			3,507	270
West Africa			4,300	5,088
French				
Africa				
Australia	22,616			
United Kingdom	320			
Other Countries	149	13,489		
Total	114,164	98,789	21,974	12,510

United States Imports of Pig Iron by Countries of Origin

	(In Gross Tons)		Ten Months Ended October	
	1935	1934	1935	1934
United Kingdom	1,050	40		540
British				
India</				

Enduring Finish...Light Weight Simplified Production Resistance to Acid

★ Combined in new Durez case for electroplating unit



Hanau Engineering's new electroplating unit makes denture plates by depositing metal on impressions of the patient's gums. Transformers, controls, ammeters, cathode and anode terminals are housed in the molded Durez case.

The Durez finish on the molded case is long-wearing, permanently-glossy, and pleasant to the touch. It will not disfigure with hard use. The Durez finish is part of the piece, not applied. Even splashover from the acid electrolytic bath will not eat away its smooth lustre.

The Hanau case is 12" high, 15" long and yet light in weight. Durez is lighter than any metal, and has the structural strength to assure long life of the unit.

The molded housing eliminates many production operations. No special insulation is necessary, because Durez' dielectric strength guards all electrical contacts from short circuiting. The complete case is produced in one molding operation.

Durez is a hot molded plastic . . . strong, light, non-

brittle, chemically inert. Steel molds form and finish it simultaneously. Finish can't chip, dent, corrode or wear off. For further data, write (telling us what you make) for booklet "20 Applications". General Plastics, Inc., 403 Walck Road, North Tonawanda, N. Y.

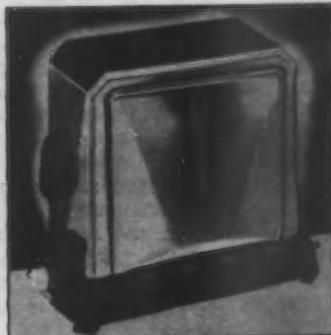
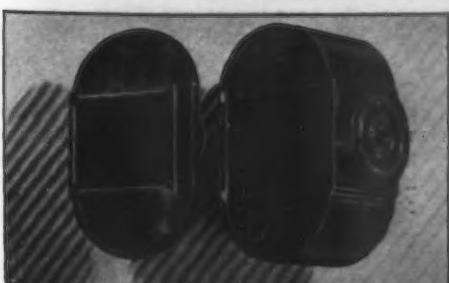
DUREZ

THE MODERN MOLDING COMPOUND

The new Varsity Camera is molded of black Durez. The large unit is produced in a single molding operation, complete with all grooves, holes, film compartments and decorations. Such elimination of production operations simplifies manufacture, and makes possible the low retail price of 39c and fast, profitable turnover. Molded by Northern Industrial Chemical Co.

This new Proctor and Schwartz toaster is a fine example of modern design. Tech-Art Plastics molded the base of heat-resistant Durez because temperatures of 400° will not affect its attractive, glossy finish.

This foot control unit on the Davis Bovic Diathermy machine requires a material that can take the toughest punishment . . . so they selected Durez. It will keep that clean, neat appearance for years despite continual rough treatment. Why? Because Durez won't chip, peel, or crack . . . the surface finish is the material itself. Durez dielectric strength eliminates special insulation.





THIS WEEK IN WASHINGTON

Row in Federation of Labor over craft-industrial union issue continues unabated.

• • •
John L. Lewis' threat to attempt unionization of large basic industries is not regarded lightly.

• • •
Administration adopts hands-off policy in labor controversy, although Miss Perkins regards it as "significant."

• • •
NRA conference on Dec. 9 is not taken too seriously by many Administration officials.

• • •
Lower courts disagree about constitutionality of Guffey-Snyder Act.

WASHINGTON, Dec. 3.—The age-old row within the American Federation of Labor over the craft-industrial union issue has again reached white heat. . . . Under the able, dynamic leadership of John L. Lewis, head of the United Mine Workers, the concentrated drive in the steel, automobile and other basic industries to establish industrial unionism is not to be discounted. . . . Easily the outstanding organized labor figure of the country, Mr. Lewis understands the art of organization and control as is exemplified by his complete dominance over the 400,000 miners banded into the mine group. . . .

It is true that during the past two years Mr. Lewis has made no progress in sponsoring a campaign to build up an industrial union in the steel industry. . . . Perhaps as head of the United Mine Workers, he did not feel free to trespass aggressively in other fields of organized labor and therefore did not put his full force back of the drive. . . . Now, however, he has definitely broken with the American Federation of Labor over the latter's craft union policy, though not withdrawing affiliation of either himself or his union. . . . On the contrary it is his plan to institute an "educational" campaign within the A. F. of L. to bring about industrial unionism. . . .

This "boring from within" process is hotly resented by President

Green of the federation, who warns of the danger of splitting the A. F. of L. wide open, a prospective development that is of grave concern to organized labor. . . . On the other hand, it is doubted by many observers that organized labor will permit a breach of such magnitude to take place. . . . It is their belief that, sharp as is the difference between the craft unionists and the industrial unionists, it will be bridged in some manner and the A. F. of L. kept intact . . . however, in view of the strong feeling of each group, the prediction is made with reservation. . . .

It is certain that, whether abortive or not, steel and other basic industries are about to be penetrated by an industrial union drive of intense proportions. . . . By no means, as has been said, does it simply reflect Mr. Lewis' "love of dramatics." . . . The industrial committee on organization, freed of affiliation with the A. F. of L. executive council, proposes to conduct an intensive campaign to bring workers in the basic industries into vertical unions. . . . It hopes first to "educate" the body of the A. F. of L. itself to this

policy, thus forcing a shift from its craft union policy. . . . If successful, the "aristocrats of labor" making up craft unions, such as the Amalgamated Association of Iron, Steel and Tin Workers, would have to surrender jurisdiction to the industrial union. . . . It is a contest that will be waged vigorously between the industrial and craft union forces and one of vital importance to industry. . . .

Mr. Lewis, however, is trying to allay opposition within the ranks of organized labor. "It is not a conflict among unions, or a striving for power among organized labor groups," he says. "We are working for a labor movement which will assure a proper future for America." . . . The objectives were indicated when Mr. Lewis, in a radio broadcast last Thursday, said "that the establishment of industrial unionism involves real recovery and reform; that shorter hours of work and reemployment of the unemployed are dependent upon its success; that it will secure a living wage for all and not profits for the privileged few; that it offers the only way to emancipation from industrial autocracy—to eco-

nomic and political freedom to those who work by hand or brain." . . . High sounding though his words were and phrased as an appeal to an unseen audience, it must be emphasized that more than mere words are back of the movement. . . .

The Administration, officially at least, is keeping its hands off organized labor's internal row. . . . Yet Madame Secretary of Labor Perkins volunteered the correct observation that the effort of Mr. Lewis to organize industrial unions is highly significant and "one of the most important developments" in recent labor organization history. . . . It may be highly significant, too, that Mr. Lewis is rated as being closer to the White House than any other organized labor leader. . . . Also it may be possible that, inasmuch as the A. F. of L. opposed the appointment of Miss Perkins as head of the Department of Labor, the discomfiture of the A. F. of L. is not regretted so much as it might be otherwise. . . .

The industrial-craft union row having come just at this time, speculation has been aroused as to whether it was staged so that the industrial unionists will be prepared to lay their program before the much publicized Dec. 9 conference called by Maj. George L. Berry, coordinator for industrial cooperation . . . the Major himself is an industrial unionist and that fact might lend force to advocacy of the program. . . . However, some say they think it would be a tactical blunder for organized labor to bring its unwashed linen to the conference. . . . They believe instead that it will stand solidly for the program outlined by Mr. Lewis for shorter hours, higher wages, "real collective bargaining," etc. . . . This may mean a drive shortly before the convening of Congress for the 30-hr. bill and other organized labor supported legislation, such as the industry-licensing bill, reestablishment of NRA, or at least expansion of the Guffey-Snyder coal act to include other industries. . . . Efforts to convince many leading industrialists that organized labor will not use the conference as a vehicle to promote these objectives have fallen on deaf ears. . . .



NRA Conference Not Arousing Interest

Interestingly enough, the conference has not aroused the enthusiasm in high Administration circles that is shown by its zealous promoters. . . . As it happens, and apparently it is only a coincidence and not a designed circumstance, the Presi-

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dent will be in Chicago to make an address to agriculturalists on the day of the Berry conference. . . . Secretary of Commerce Roper, whose Business Advisory Council has been given the run around as to participation in the conference, shows no enthusiasm for it. . . . Actually it is believed in some Administration circles that the conference might be a disturbing influence in halting recovery and no such eventuality is desired. . . .

There are evidences that the conference will develop some real rows, for it is well known that some industrialists are going to attend as critics, not supporters, and will vigorously oppose legislation for reviving NRA or anything that resembles it. . . . They are happy that the NRA circus is over and cordially hope it will remain only as an unpleasant memory. . . . That the conference and "widespread acceptance" of in-

vitations to attend have been overballyhooed is evident from the opposition to it coming from such sources as the National Association of Manufacturers and the Chamber of Commerce of the United States. . . Officially absent from the conference will be such basic industries as the steel, automotive and lumber. . .

The Machinery and Allied Products Institute has also gone on record as being vigorously opposed to further NRA legislation. . . When the large proportion of the country's employment in these industries is considered it is difficult to see how the conference can be at all representative. . . But if the least excuse is given for further legislation, it is certain that it will be recommended and pushed. . . the fact remains that the heavy industries, the large employing groups, want to see NRA fade out of the picture on April 1 as it will unless there is further legislation. . .

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Disagreement on Guffey-Snyder Act

The big-little NRA, otherwise known as the Guffey-Snyder coal act, a particular pet of Mr. Lewis, emerged from the Supreme Court of the District of Columbia last week badly battered on one side but sound on the other. . . Justice Jesse C. Adkins, in an oral opinion, held that the sections providing for determination of wages and hours through collective bargaining were invalid. . . This finding was based on the Scheeter Poultry Co. decision by the United States Supreme Court last May when it knocked out the blown-in-the-bottle Blue Eagle. . .

But while blasting the wage and hour provisions, Justice Adkins held constitutional the price fixing and taxing provisions of the Guffey-Snyder act. . . It was on the price fixing provisions, Justice Adkins said, that the Government relied "most strongly." . . On this basis, the Government won again. . . For previously Judge Elwood Hamilton at Louisville, Ky., gave a clean bill of health to the act. . . He said the whole thing was constitutional. . . Judge Adkins ruling against the wage and hours provisions didn't disturb the United Mine Workers inasmuch as their contracts cover both wages and hours for virtually the entire industry. . . But labor as a group did not like the decision. . . Judge Adkins' opinion grew out of the J. W. Carter case. . .

Not a great deal of weight has been given the decisions of either of the two lower courts inasmuch

as the act will be brought before the Supreme Court of the United States for final test as to its constitutionality. . .

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Scrap Institute to Be Represented at NRA Conference

The Institute of Scrap Iron and Steel will be represented at the Dec. 9 conference of industry, called by Coordinator Berry at Washington. It was the consensus of opinion of the institute board members, that the institute should attend the conference to watch developments and to protect the interests of the scrap iron industry wherever they may appear, according to Benjamin Schwartz, director general of the institute. It is understood that the scrap iron industry will be grouped with the iron and steel division of the conference, and that any developments at the conference will be referred back to the institute board for consideration, on their respective merits.

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Bolt Packaging Practice Is Reaffirmed

The Division of Simplified Practice of the Bureau of Standards has announced that simplified practice recommendation R60-30, packaging of carriage, machine and lag bolts, has been reaffirmed, without change, by the standing committee of the industry.

Copies of the recommendation may be obtained from the Superintendent of Documents, Government Printing Office, Washington, at 5c. each.

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Eastman Praises Use of Light Weight Metals for Railroad Rolling Stock

The use of light-weight metals for railroad rolling stock construction was praised by Joseph B. Eastman, Federal coordinator of transportation, speaking at the annual banquet of the Associated Business Papers, Inc., in New York, Dec. 2.

Mr. Eastman said that "the need for light-weight, non-corrosive metals with the requisite strength for railroad use has been fully recognized, and much progress has been made along several different lines in the development of such metals, and also in engineering improvements of types of construction which will in themselves have the effect of eliminating unnecessary weight."

"The needs of automobile and airplane construction," Mr. Eastman went on, "gave the first impetus to such developments, but

what has been learned there is now in the way of being applied to railroading. Already light-weight cars are on trial in both passenger and freight service, not only here but in other parts of the world, and only a mere beginning has been made. The great need now is for reduction in the production costs of these new metals, and there is indication that through modern research and production methods that problem will eventually yield to treatment."

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Navy Steel Purchases

The Bureau of Supplies and Accounts, Navy Department, will open bids Dec. 17 on 542 tons of shapes and 430 tons of medium rivet bars for the various Navy yards. On Dec. 13 bids will be opened on 5900 steel boiler tubes. Bids were opened Dec. 3 on 223,000 lb. of nickel steel rounds.

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Holds Steel Rates Not Unlawful

The Interstate Commerce Commission has handed down an opinion holding that rates on iron and steel articles, in carloads, from Chicago, Milwaukee, St. Louis, Duluth, Minn., and points taking the same rates to Omaha, Neb., Sioux City, Iowa, and Sioux Falls and Aberdeen, S. D., are not unduly prejudicial or otherwise unlawful.

It also held that rates on iron and steel articles, in less than carloads, between points in Western Trunk Line territory are not unduly prejudicial. Complaints against the rates are made by commercial organizations of Omaha, Sioux City, Sioux Falls and Aberdeen.

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PWA Issues 25 Per Cent Differential Order

The revised PWA order issued on Tuesday of last week by Harold L. Ickes, public works administrator, raising from 15 to 25 per cent the price differential in favor of domestic materials as against foreign materials for PWA-financed projects reflects a wide change from the original order. The latter made mandatory the purchase of foreign materials where their price was 15 per cent or more under the price of domestic materials.

The new order not only raises the differential to 25 per cent for purchases in excess of \$100, but, notwithstanding this differential, it calls for domestic materials unless the Administrator shall consent to the purchase of foreign materials. Moreover, the Administrator's consent for the purchase of foreign materials will not be given unless

the purchase of domestic material "would unreasonably increase the cost of the project."

It will thus be seen that broad leeway over and above the 25 per cent differential is given in favor of domestic materials. This is in accordance, as steel makers have urged from the outset, with the Treasury-Post Office Department appropriation act of 1933 relating to the purchase of materials for Federal projects and the \$4,880,000 works relief act of 1935 relating to the purchase of materials for non-Federal projects.

The text of the order follows:

SUBJECT: Domestic Materials for Non-Federal Projects

Part I
Domestic Materials Regulation

1. A differential of 100 per cent in favor of domestic materials shall apply on all purchases of articles, materials, or supplies for a project where foreign materials are offered at a price of \$100 or less. A differential of 25 per cent in favor of domestic materials shall apply on all purchases of articles, materials, or supplies for a project where foreign materials are offered at a price in excess of \$100.

2. Notwithstanding that, after the differentials provided for herein shall have been applied in accordance herewith, the price at which domestic materials are offered exceeds the price at which foreign materials are offered, only domestic materials shall be purchased for a project, unless the Administrator shall consent to the purchase of foreign materials. Such consent will not be given unless the purchase of domestic materials would unreasonably increase the cost of the project.

3. With the consent of the Administrator, this regulation shall not apply where it is impracticable to purchase domestic materials.

4. The words "domestic materials," as used herein, shall mean only such unmanufactured articles, materials, and supplies as have been mined or produced in the United States, and only such manufactured articles, materials, and supplies as have been manufactured in the United States substantially all from articles, materials, or supplies mined, produced, or manufactured, as the case may be, in the United States. The words "foreign materials," as used herein, shall mean all articles, materials and supplies other than domestic materials.

Part II
Operation of this Order

1. All domestic materials regulations, including Administrative Order No. 27 and the schedule annexed thereto (PW 35008), paragraph 7 of the Construction Regulations of PWA Forms Nos. 166, 171, 179, 180 and 199, and paragraph 9 of the Construction Regulations of PWA Forms Nos. 188, 190, 191, 200 and 202 are hereby rescinded, and in lieu thereof a regula-

tion in accordance with Part I of this Order shall be substituted.

2. All domestic materials regulations contained in existing agreements between the United States and borrowers from or grantees of the Public Works Administration shall be and are hereby waived. This waiver is conditioned upon compliance by any such borrower or grantee in any future advertisements for bids and any future awards of construction contracts with a regulation in accordance with the provisions of Part I of this order.

3. All construction contracts heretofore entered into by any such borrower or grantee which contain any domestic materials regulation as a provision thereof may be amended by any such borrower or grantee, with the assent of all of the parties thereto, by inserting a regulation in accordance with Part I of this order in lieu of such provision.

4. Any evidence of collusion or unfair practices should be referred to the Administrator for investigation by the proper governmental authorities.

5. This order shall take effect immediately.

(To be inserted verbatim in all contracts)

"Only such unmanufactured articles, materials and supplies as have been mined or produced in the United States and only such manufactured articles, materials and supplies as have been manufactured in the United States substantially all from articles, materials or supplies mined, produced or manufactured, as the case may be, in the United States, shall be employed in the construction of the project, provided that the owner, with the consent of the Administrator, may permit the purchase of foreign articles, materials or supplies if the use of domestic articles, materials or supplies is impracticable or if the foreign articles, materials or supplies are lower in cost after the following differentials are applied in favor of the domestic articles, materials or supplies:

"On purchases where the foreign bid is \$100 or less, a differential of 100 per cent will apply;

"On purchases where the foreign bid exceeds \$100, a differential of 25 per cent will apply."

Federal Trade Commission Asks for Broader Control Over All Industry

WASHINGTON, Dec. 3.—Reaching out for still further control over industry, the Federal Trade Commission, in its annual report for the fiscal year 1935, asks Congress for additional broad amendments to the anti-trust laws. In view of the commission's vigorous opposition to the basing point system in the iron and steel industry, it seems evident that one outstanding amendment, if enacted, might well be directed toward outright abolition of that system.

The amendment would specifically prohibit not only unfair methods of competition in commerce, but also "unfair or deceptive acts and practices in commerce." The commission has assailed the basing point system as an unfair practice and contends that the amendment is necessary to protect the public interest. It would be made to Section 5 of the Federal Trade Commission act.

"This recommendation is made in order to give the commission clear jurisdiction over a practice which is unfair or deceptive to the public and is not necessarily unfair to a competitor," the commission report says. "There are times when such a practice is so universal in an industry, that the public is primarily injured rather than

individual competitors. In such cases it is very difficult, if not impossible, to show injury to competitors, but the injury to the public is manifest."

The proposed amendment reads as follows:

"Sec. 5. Unfair methods of competition in commerce and unfair or deceptive acts and practices in commerce are hereby declared unlawful.

"The commission is hereby empowered and directed to prevent persons, partnerships, or corporations . . . from using unfair methods of competition in commerce and unfair or deceptive acts and practices in commerce."

Old Grudge Again Aired

The commission has always been dissatisfied and even bitter, because the steel industry did not turn to the f. o. b. mill system of quoting prices on the strength of its order of 1924 following its so-called Pittsburgh-plus investigation. The basing point system has been condemned by the commission as a price-fixing device. The commission order, in the commission's own words, was not simply to refrain from following the Pittsburgh plus single basing-point practice, but more broadly and explicitly:

"From quoting for sale or selling . . . upon any other basing point than that where the products are manufactured or from which they are shipped."

In two reports the commission had sharp encounters over the issue with the National Recovery Administration. In a report on March 19, 1934, in response to the Borah resolution, the commission said the steel code in effect declared unfair and unlawful the practice of f. o. b. mill base pricing "which the commission assumed to be fair competition. But more than this, it requires important steel producers to violate the commission's order and permits all to ignore it."

In a second report, made public March 17, 1935, the commission recommended that code provisions giving executive sanction to the multiple basing point system in the steel industry be eliminated. It proposed that the system be made open to legal attack on the ground that it violates the anti-trust laws. This latter report was made in response to an executive order by the President. The President directed the commission and the NRA to study "further and jointly" the operation of the basing point system and its effects and invited "recommendations for the revision of the code, in accordance with the conclusions reached."

Instead of being a joint study and report, the two bodies, in strong conflict with each other, made separate studies and reports. The commission stuck to its old principle in favor of the mill basing point system. It did not recommend its adoption, however, for it said it saw legal difficulties as well as the fear that the industry would not adopt the plan. The NRA recommended adoption of a group mill base system.

Profited by Decline of NRA

Now that NRA has been reduced to a mere fact-finding body and some of its old powers restored to the FTC, the commission evidently is not only endeavoring to hold, but greatly to broaden its jurisdiction. It is easy to believe that if the wider authority asked were granted it would be directed against the basing point system in the steel industry. Ironically and significantly enough, the commission report was made public on the eve of the conference called for next Monday by Maj. George L. Berry between management and labor for "industrial cooperation"—and clearly for new legislation to restore the power of NRA.

The attitude of the commission toward the iron and steel industry is to be considered also apart from the additional power it seeks. For it has under scrutiny a so-called investigation as to alleged collusive bidding by steel makers on PWA projects. Inspired by Harold L. Ickes, public works administrator, the President has asked that the commission proceed with the inquiry. The commission, as a matter of fact, has already passed judgment on the question of so-called collusive bidding. It did so the last time in its report of last March when it whacked both the steel code and the steel industry. In effect it charged that the code, approved by the Administration, which is now asking for the "collusive bidding" investigation, encouraged identical bidding.

Pointing to conditions existing since the code was last amended, May 13, 1934, the commission said:

"Evidence in the form of bids by various steel producers and jobbers on Government business, particularly bids to the Navy Department, is to the effect that bids on large quantities, containing numerous items, are identical in gross amounts and in unit prices to the fourth decimal point. The identity of bids has been so consistent that Government purchasing officials are reduced to the impotence of making awards by lots. Private buyers are in no better position than the Federal Government."

Asks for More Power

In its annual report the commission also recommended two important amendments to the Clayton Act, in order to give it great power. One proposed amendment is claimed to be for the purpose of clearly defining the discrimination in price now intended to be forbidden. The amendment would require all manufacturers of merchandise, other than perishables, selling in interstate commerce, to report promptly to the commission whenever they make special discounts and allowances which are not openly and generally made and published to the trade. Failure to make such reports or the making of willfully incorrect reports would be subject to penalty. The commission, ever seeking more funds and greater authority, naively says that, "It is readily apparent that the volume of work flowing from the requirements of such reports would necessitate substantial appropriations properly to administer this provision."

Another amendment, asked for

in previous reports, would give the commission power to prevent one company from acquiring assets of another in the same industry. The commission at present has power to prevent acquisition of stock control only. The commission said that if Section 7 of the Clayton Act is to accomplish the general purpose of preventing monopoly, it should be amended to prohibit acquisition of assets, not only indirectly through use of stock unlawfully acquired, but also direct acquisition of assets independently of stock acquisition.

Steel & Wire to Build Two Rod Mills

THE American Steel & Wire Co., a subsidiary of the United States Steel Corp., will build two new rod mills at Joliet, Ill., to supply its two plants in that vicinity.

The new plants will be constructed at a cost of \$3,000,000. Work is expected to begin within the next 30 to 60 days and the plans call for completion of the plants within six months. They will have a joint annual capacity of 220,000 gross tons.

The new mills will be capable of producing wire rods in coils weighing 600 lb.

OBITUARY

LESLIE E. HOOKER, inventor of the extrusion process for the production of metal tubing, died at his winter home in San Mateo, Fla., on Dec. 2, aged 78 years. He was born at South Edmeston, N. Y., and spent his early life in the practise of law. He later served for many years as general manager of the Metallic Sheet & Tube Co., Pawtucket, R. I.

* * *

JOHN J. MILLER, secretary of the Loeffelholz Co., Milwaukee, manufacturer of railroad supplies and brass and aluminum castings, died on Nov. 22, aged 77 years. His son, GEORGE B. MILLER, is assistant secretary of the company.

* * *

CASSIUS C. CHANEY, vice-president of the General Refractories Co., Philadelphia, died in Philadelphia on Nov. 1, aged 48 years. He had been associated with the company for 20 years.

One American Revolution at a Time!

Outcome of Half a Century's Overturning Still Much in Doubt

• • •
By ALVIN I. FINDLEY
Editor Emeritus, The Iron Age
• • •



IN no other American depression has so much been said of a coming revolution as in that of the past six years. The word has tripped from many tongues and pens. Whether the writers have had in mind Russian communism, a dictatorship at Washington, a planned economy under "social control," the abolition of competitive capitalism, or simple legislation for "sharing the wealth," each has pointed to a new ordering of American life as something impending or in the making.

As he reads such predictions, one questions whether these prophets appreciate the extent and meaning of the great revolution our American life has seen in the past two generations. Indeed, since that revolution is still under way, he might well be moved to cry out, "One revolution at a time!"

Were one trying to measure in a sentence the distance the American people have covered in the past half century's social and economic advance, he might use a notable utterance of Dr. Robert A. Millikan. That eminent scientist said in a Phi Beta Kappa anniversary address of a year or two ago that in the conduct of his daily life and in his manner of thought he was more remote from his own grand-

FROM his exceptional vantage point of a life time spent as an industrial observer, the former editor-in-chief of *The Iron Age* comments upon the American revolution.

Mr. Findley presents to us a clear picture of the great changes that have taken place in living, working, reading and thinking during the past half century. The problem of the future, as he sees it, is that of advancing moral values commensurately with our great progress in material values.

father than his grandfather was from the earliest man mentioned in recorded history. That is nearly equivalent to saying that the changes of the past 50 or 60 years have been in many respects more revolutionary than those of all previous years in human history.

Back there American life—the

average of it—was simple, much of it isolated and static. Today we find complexity—great complexity, contact—much contact, and movement—rapid movement.

The Drift to the City

In the great American metamorphosis of the half century a dominant factor has been the drift from country life to city life. Mechanization has so hastened this movement that whereas in 1884 only 16 millions of a total population of 54 millions were classed as urban, in 1934 the city dwellers were more than 70 millions of a people numbering 125 millions. That is, we have about 2 1/3 times as many people as in 1884, but the city dwellers are 4 1/2 times as many as in 1884—30 per cent in cities back there; 55 to 60 per cent in cities today.

Country and village dwellers of the 1880's, with only horse-drawn vehicles, were cut off for weeks from the centers of life by impassable roads. Millions of them lived and died without having gone a dozen miles from the place of their birth. Contrast the millions of automobile owners of today, any one of whom between morning and night can easily cover 500 miles on smooth, hard roads.

Were it possible for a modern to

step into the average home of the eighteen-eighties he would say at once that it belonged to a life that was simple, even naive. How sharply it contrasts with our latter-day speed and sophistication!

Women in Industry

The twentieth century increase in the number of working women, especially married women, is startlingly rapid. In 1880 something more than 2½ million women were gainfully employed in the United States. In 1930 the number was nearly 11,000,000, or more than four times as many.

With the rapid increase in the number of working women has come the transfer to the factory of much of the old-time employment in cooking and sewing. However, the factory production of men's, women's and children's apparel dates back to many years before the advent of shop-prepared foods. Perhaps no small cause of the large-scale transfer of food preparation from home to factory has been a growing distaste of women for cookery. In all that has been written of the great annual outpouring of college trained women, the growing desire of women for careers in the outer world—and if not careers, just gainful work—there has been more or less confusion of causes with effects. Also the old-time thinking about home, marriage and children has met the impact of change in so many directions that he would be rash indeed who dared a diagnosis of the causes, much less a prediction of the outcome.

Revolution in Wages

The common manual laborer of today earns three to four times the wage rate of 1885 and, when he is employed, works about two-thirds as many hours in the week. Even before the depression the shortening of hours of labor made the employment of leisure time a live issue in many walks of life. No wonder then—although not altogether good and perhaps not altogether bad—that the sports section of our daily papers run into pages as against columns 50 years ago, and that for a good part of the year one-seventh of our population attends some form of movies every day. To a great majority of the readers of our daily papers the names of sports writers and columnists are better known today than those of the editors-in-chief.

There is a long story in the in-

dispensable things in our lives today that were unknown or in the luxury class in 1885. Summed up in the characteristic speech of our day it reads: "There, little luxury, don't cry; you'll be a necessity by and by." By millions of American families what was thought 50 years ago to be comfortable living would now be considered a privation existence. Desire for the so-called satisfactions of life and the belief that their possession was as inalienably American as the constitutional right of life, liberty and the pursuit of happiness grew at an astonishing pace in the post-war and pre-depression years. The decade following the World War brought an unparalleled increase in the amount of money which most American families had to spend, or thought they had. Every town of any pretensions had its country club. By common consent it was decided that the American wage and the American standard of living called for at least one automobile in every family. Apostles of the new economics told the wage earner that to come into his best estate he must widen his horizon by freely spending his wage, even pledging it for new gratifications before it was earned.

And here the statistician breaks in to tell us of the 17 million telephones in the United States that carry 77 million messages every business day in the year; of our 24 million motor cars (we had 26½ millions before the depression), our 19 million radio sets, 10 million vacuum cleaners, 6 million washing machines, not omitting 9000 to 10,000 airplanes.

Revolution in Communication

Perhaps no contrast we might draw could measure so strikingly the distance we have come in a half century as one I am about to mention. On a July day in 1881 a shot was fired that laid low the President of the United States. Many hours passed while millions of our people were ignorant of that tragedy, and days went by before the news penetrated to the more remote of our rural homes. And now for the contrast. Last year the dweller in the loneliest corner of our land, miles from his nearest neighbor, with only the flip of a finger on a dial became a listening guest at one of the most notable royal weddings of the century. As clearly as though he sat in Westminster Abbey he heard the wedding march from the great organ, the pledges of the

royal pair and the admonitions of the Archbishop of Canterbury.

Revolution in Thinking

Since it was the purpose of this paper to deal in a suggestive way with the revolutionary changes which 50 years have wrought in American every-day life, we can only refer in a few words to the even greater changes in our thinking. The triumphs of science have been told with fairly tiring repetition. We are cracking the atom, the splittings of the second have become infinitely small, and our scientists are ascending high mountains or piercing the stratosphere in relentless efforts to trap the cosmic ray. We read lately of the new timer comparer and broadcaster devised by Capt. Frederick Hellweg, superintendent of the Naval Observatory. This makes it possible to obtain the most accurate time in the world by dividing the second into a thousand parts. At New York University not long ago the noise the cotton-boll weevil makes when chewing was magnified by a "sound microscope" 10,000 billion times, and so great was this noise that it could be heard all over one of the university buildings.

In religion and in education the changes have been momentous. Fifty years ago, and even 25 or 30 years ago, penitents were urged to flee from the wrath to come. Today fear as a religious motive has largely disappeared. So many material satisfactions filled the lives of the people in pre-depression years that long ago the hymn of our grandfathers which called earth "a desert drear" and proclaimed heaven as the real home of the traveler, ceased to be sung. And now the loosening hold of the church on our American life is widely recognized and by many deeply deplored.

Who would have believed 50 years ago that this country could ever spend too much on education? However, in the marked drift of our people to the cities, school facilities have increased to the point of provoking tax-payers' protests against the leaps and bounds in board of education budgets. Hundreds of high schools today offer courses nearly as far advanced as were those of scores of our colleges 50 years ago. And now college authorities are asking whether the flocking of young people to the campus has not been overdone. Attitudes of would-be collegians are

being put to the test and entrance requirements raised.

Revolution in Reading

And what have the half century's changes done to the reading habits of the American people? Naturally, with millions now unemployed, very recent years have recruited the ranks of readers, but in the years just preceding 1929 (and to an almost equal extent today) sports, the movies and the radio have left little time in the average life for reading, apart from the daily newspaper and the magazines.

There are signs in some directions that the illustrator is making a stronger appeal than the writer. One sometimes asks, as he watches his fellow passengers on suburban trains, turning the leaves of popular publications, paying attention largely to the page or page of attractive illustrations, whether there has not been a decline in the influence of the written word. Frequenters of the movie, having learned to take in its dramatic movement in flashes and jumps from one episode to another, the events of years often being telescoped into a moment, have less and less patience with the slower sequence of the printed page.

Dominant Influences

What we have said thus far has been largely a series of contrasts between certain phases of everyday American life 50 years ago and like phases of our present-day life. Some characteristics of the old-time life have been important and lasting and others transient fashions, more interesting than important. Great problems have been created by the multitude of changes. Had there been no World War and no cataclysmic depression, we still would have had crucial social and economic problems, particularly that of the distribution of the fruits of prosperity, when there was any, and those due to a progressive decline in public and private morals. But taking things as we find them the dominant influences in our life today are broadly two:

1. Consequences of the half century's bewildering changes in modes of living and thinking.

2. Consequences of the World War—consequences that are many and of tremendous import.

In the past two decades our American life has fallen under the

blight of no fewer than five wars which either broke out in the train of the World War or were waged more fiercely than in the years before 1914:

1. A war on thrift. Millions of its recruits came from the ranks of labor, under the urging that the wage-earner's function was to spend his pay and pledge his future pay to maintain mass production in ever increasing volume and thereby insure a continually high wage scale.

2. A war on work. In every walk of life millions of American men and women enlisted for this war in the booming 1920's, all believing that eventually, through fortunate speculation, they would be supported by the labors of others.

3. A war on law. Not only did millions make their living, and arch criminals fabulous profits, in unlawful trade in liquor, but crimes of violence and theft were rampant. The President of the United States called it "the subsidence of the very foundation of government."

4. A war on decency. Both the stage and the movies, in their greed of gain, fell to depths never equalled in the history of our theater. American boys and girls received impressions from these salacious portrayals that will have a long trail of unhappy consequences.

5. A war on religion. Material prosperity was on an unprecedented scale in most 20th century years and with it was a growing and little controlled appetite for pleasure. The result is a lessened influence of the church and of all teaching that has self-denial at its center.

The Administration Influences

It would be going beyond the thought which prompted this paper, to discuss the ultimate effect upon every-day American life, of the forces set in motion by the present administration at Washington. In more than two years of the New Deal the main objectives of the President and his advisers have been to give relief to millions of unemployed, to make up to the farmer some of his repeated losses, to bring about a redistribution of the wealth of the country, to reduce hours of labor and raise wages, to insure workers against unemployment and to provide pensions for the aged. Some of the measures adopted have already failed signally. Of the remainder, some are salutary and will succeed; others will yet be abandoned.

As time passes less heed is given to prophecies of a great social and economic revolution under the leadership of the new President. Some things in the old order are gone and will not return; but already it

is apparent that prophecies of an early passing of the capitalistic system will not be realized. There is much uncertainty as to the future and questioning whether the worst has actually been seen.

James Truslow Adams believes—and many of us will agree with him—that what we have been passing through is more a character crisis than an economic crisis. If that is so, then recovery is not as near as the ruling theorists have promised, seeing that the mending of human ways—in conduct and thinking—is a slower process and often a more painful one than the changing of economic ways.

Character Must Catch Up

It is all too true that in the half century we have been considering—particularly in the second half of it—American progress in science, invention and all the mechanic arts has been far greater than our advance in the humanities. Quite in agreement with Mr. Adams is this estimate of American progress which Henry Ford gave on the eightieth anniversary of the *New York Times*:

"As to mechanics and science, we cannot base our claims to progress upon them. The increase of knowledge means little without a corresponding increase of conscience. It is only man that progresses. What we have done is this: we have shot so far forward on the intellectual line that we have created a dangerous salient. We must bring up the whole line, straighten out the whole line, else the gains of our forward push are in danger. I believe with Emerson that 'talent sinks with character,' that material increase is definitely checked by moral decrease.

"We shall enter the future through an ante-room of self-searching and through something very like penitence for our past stupidity. I believe we shall say less about social consciousness and begin to show evidence of actually having that of which we have only talked. After all, the only profit of life is life itself, and I believe that the coming 80 years will see us more successful in passing around the real profit of life. The newest thing in the world is the human being. And the greatest changes are to be looked for in him. . . . Perhaps our most progressive step will be the discovery that we have not made so much progress as the clatter of the times would suggest."

And by an interesting coincidence, the same day's paper that carried this opinion of Mr. Ford had a cablegram from London quoting these words from George Bernard Shaw:

"The trouble is that everybody is

talking about the economic situation when they really ought to be discussing the moral situation. They want to revise everything but human conduct, and it is human conduct that should be revised. When we get that right, the world will be better."

Mr. Ford's use of the word "penitence" leads me to recall what Newton D. Baker said at an Ohio college commencement which I attended a few years ago. He expressed all sympathy with youth and believed that the so-called revolt of youth had been exaggerated. But he added that he could not resist the conviction that this American generation and the oncoming generation were light heartedly throwing away some very precious things which the next generation would seek to recover with tears.

Dr. Glenn Frank in a recent address puts Henry Ford's thought in another way, referring to the problem created by the fact that

"the physical sciences have produced changes faster than the social sciences have perfected social controls." He says:

"Scientific progress has moved countless millions out of the ancient shelters in which they had a decent measure of economic security, social stability, and spiritual peace, even if the life lived there was meager in content and convenience, and has left them unsheltered under the storm-swept skies of a strange world."

"In a new world, born of science, these millions have had a few more gadgets in bathroom and basement, and there has been a transient lift in living standards, when the going has been good, but they find even these boons snatched suddenly from them in this current phase of economic insecurity, social instability and spiritual confusion."

May I call one more witness? Arthur Twining Hadley, for years the distinguished president of Yale, a foremost economist and very practical man of affairs, gave us

his estimate of the crowning values of life in these memorable words—the final sentence of his last baccalaureate address:

"So to live and so to think that those about us will have more courage and self-sacrifice and larger and truer vision of what is required of man—these things are more important than all the scientific principles we can discover or all the material results we can achieve."

It is more than coincidence that five such men are so strikingly agreed on the thing most to be sought in this critical time. Many others in all walks of life are sensing the need for higher avenues of progress. The World War, following upon 30 years of bewildering change, caused a cataclysmic dislocation in our scale of values. The task before us, which will be both long and painful, is to bring about the right alignment, putting human values first where they belong.

Iron Ore Water Shipments This Year Show 28 Per Cent Increase Over 1934

SHIPMENTS of Lake Superior ore by water during 1935 were 28,362,368 tons, an increase of 27.7 per cent over 1934 when water shipments amounted to 22,249,600 tons. The movement during November was 1,557,494 tons, an increase of 21.67 per cent over the same month last year. The last ore cargo for the season was shipped from Escanaba Nov. 29. The November movement was the best since 1930.

The effect of the depression was not greatly felt until 1931 when shipments dropped to 23,467,786 tons. Ore consumption increased at a greater rate than shipments in 1935 and stocks on docks and in furnace yards Jan. 1 will be approximately 3,000,000 tons less than on Jan. 1 this year. Total

LAKE ORE SHIPMENTS BY WATER

	Gross Tons		Season November	Season 1935	Season 1934
Escanaba	293,545	1,823,655	293,545	1,823,655	1,543,737
Marquette	212,938	2,963,603	212,938	2,963,603	2,207,566
Ashland	219,927	3,068,784	219,927	3,068,784	2,286,766
Superior	542,908	10,276,176	542,908	10,276,176	6,996,206
Duluth	144,293	6,995,979	144,293	6,995,979	6,015,630
Two Harbors	143,883	3,234,171	143,883	3,234,171	3,199,695

WATER SHIPMENTS OF LAST TEN YEARS

	Gross Tons		
1926	58,537,855	1931	23,467,786
1927	51,107,136	1932	3,567,985
1928	53,980,874	1933	21,623,898
1929	65,204,600	1934	22,249,600
1930	46,582,982	1935	28,362,368

shipments by ports during 1935 and shipments for the season for the past ten years are shown in the accompanying table.

Southern Pig Iron Agencies Changed

SLOSS-SHEFFIELD STEEL & IRON CO., Birmingham, has appointed E. Arthur Tutein, Inc., 52 Vanderbilt Avenue, New York, as Eastern sales agent, while United States Fuel & Iron Co., Oliver Building, Pittsburgh, has been appointed sales representative in that territory.

F. W. Marshall & Co., Pennsylvania Building, Philadelphia, who have been Sloss-Sheffield representatives in the East, have been named agents in that territory for the Woodward Iron Co., Birmingham.

Empire to Enter Tin Plate Field

EMPIRE SHEET & TIN PLATE CO., Mansfield, Ohio, will add tin and terne plate to its products and is installing a complete plant with furnaces, mills and other equipment for making these materials. The equipment will be housed in one of the present buildings which is being remodeled.



NEWS OF THE WEEK

Job Insurance Data to Be Required Of Employers in New York State

THE division of unemployment insurance of the New York State Department of Labor has issued two important instructions to employers of the State covered by the unemployment insurance law, to assist them in arranging their records to contain the information required for the administration of the law. The instructions are also designed to make available to the division necessary preliminary data with regard to contributing employers. They have been approved by Industrial Commissioner Elmer F. Andrews.

Official instruction No. 1 provides that each employer covered by the law shall keep on his employment and pay roll records, with respect to each individual insured employee, beginning Jan. 1, 1936, the following information:

Insured employee's name; wages earned during pay roll period; number of days worked during pay roll period; total number of hours worked during pay roll period; full scheduled hours per week for employees or group of employees; date when employee quits or is "laid-off," either permanently or temporarily, or is discharged; date employee is hired or reinstated after "lay-off" or is re-hired; place of employment. Space is also to be reserved on the employer's records for employee's insurance number which will probably be issued for New York State unemployment insurance identification and possibly for Federal social security legislation.

Under instruction No. 2, it is

required that each employer covered by the law shall on or before Jan. 1 furnish information requested on "the initial statement by contributing employers." This section merely covers the address and nature of the business, questions of ownership and other information for the purpose of registration and classification of employers. The information required in the initial statement, in detail, is as follows:

Name of employer, address, places of business in the State, exact nature of business, chief products if industrial; person, firm or holding company owning majority control or ownership; names and addresses of subsidiaries owned or majority controlled; number of employees insured under the law as of Dec. 1, 1935; name of other employers of employees supervised but not employed by reporting employer; list of pay rolls, where they apply, approximate average number of employees in 1935 and approximate number of those added to or released from employment.

Employers receiving the instructions who claim they are not subject to the law are requested to file a statement to this effect, giving information showing why they believe they are not subject thereto.

For purposes of employer records, the State has been divided into two areas, the New York City metropolitan area, which includes Westchester, Nassau, Suffolk and Rockland Counties, and the up-state area, including all other

counties of the State. The upstate area employers are to communicate with the director of unemployment insurance at the Broadway Arcade Building, Albany, and employers in the metropolitan area are to address the director at 342 Madison Avenue, New York.

Plans for Foundry Show Being Made

LARGE attendance at the recent national metals and machine tool shows, that broke previous records for these events, has focused attention of manufacturers of industrial equipment on the interest that is being displayed throughout all industries in the developments and improvements in machinery, equipment, and materials. Similar interest and large attendance are anticipated at the coming fortieth annual American Foundrymen's Association Convention and the Foundry and Allied Industries Exposition to be held in Convention Hall, Detroit, May 4 to 9, 1936.

Accordingly, plans are being made for one of the largest displays of equipment, materials and supplies for the foundry and allied industries in the history of the association.

Tentative schedule of events calls for registration, plant visitation and committee meetings on May 4, and formal opening of the exposition May 5, with final closing May 9. Open hours for the exhibit have been set tentatively for 9:00 a.m. to 6:00 p.m. daily. Saturday will be Detroit Day and plans are under way to make it the feature exhibition day of the week.

Detroit Electric Furnaces Are Now Completely Automatic

A STEP forward toward a completely automatic furnace for controlled electric melting has been announced by the Detroit Electric Furnace Co. This new automatic equipment will be embodied as standard on all 1936 rocking furnace models. The new device provides a means for automatically controlling the rocking cycle of the furnace to compensate for differences and variations in the charge.

The Detroit engineers analyzed the melting variables which have to be dealt with in a foundry and found that they fell into several classes, namely, (1) differences in physical characteristics of the charge, which may range from turnings and borings to small scrap and heavy pig; the variations in weight per cubic foot are large and different rocking cycles are required for maximum thermal economy; (2) differences in specific heat of the charge, which are great because the same furnace equipment may be called upon to handle lead, tin, copper, nickel, iron and steel; (3) differences in chemical composition, which are even greater including, as they will, not only the above metals, but silicon and alloys such as tungsten, cobalt, chromium, nickel, vanadium, titanium, frit and chemical combinations; (4) variations in tapping temperature, which may easily range from 2100 to 3000 deg. F.; and (5) differences in total weight of the charge, which may vary from heat to heat although the furnace capacity remains constant.

The new automatic rocking control enables the furnace operator to *predetermine and repeat* the rocking cycle which is most advantageous metallurgically and thermally. The correct cycle may be repeated exactly.

The roof and hearth of the furnace may be alternated on successive heats thus equalizing the wear on the lining with a consequent lowering of lining cost. The device enables the operator to bring the furnace to full rock, automatically, in the shortest possible time so that the charge may be rapidly melted, utilizing the heat stored in the lining, as well as that directly from the arc. The new mechanism will, therefore, improve thermal economy and aid in reducing melting cost.

A distinct advantage is the fact that the rocking cycle may be recorded on the log, together with data as to composition, power in-

put and weight. The metallurgist can add to this the resulting physical compositions obtained and the results are thereafter available for easy duplication. In combination with automatic electrode control, which has already been developed for the Detroit Rocking furnace, this new device gives to the foundry, an improved and practically automatic melting furnace.

On the new control a set of dials is provided which determines first,

the location of the door at the time the rocking is to start, second, the initial angle of rock, third, the duration in minutes of the initial angle before the rocking angle is gradually increased, fourth, an adjustment for rapid increase or slow increase so that for bronze, for example, the furnace may come to full rock 20 min. after it is started and for iron or alloy steel, in 50 min. This is especially useful since the rate of rocking increase can be accelerated, automatically as the charge becomes more and more molten. This rocking angle increase rate is controlled by a special feed cam, in accordance with curves worked out by Detroit Electric Furnace Co.

British Pig Iron Makers Are Refusing Orders—Steel Mills at Capacity

LONDON, Dec. 2 (By Cable).—Pig iron makers are booked well into 1936 and are reluctant to enter further commitments. They are avoiding export business. Because of dearer raw materials, higher hematite prices are expected.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese,	
export	\$9
Billets, open-hearth	\$5 10s. to \$5 15s.
Tin plate, per base box.....	18s. 9d. to 19s. 3½d.
Steel bars, open-hearth	\$7 17½s.
Beams, open-hearth	\$7 7½s.
Channels, open-hearth	\$7 12½s.
Angles, open-hearth	\$7 7½s.
Black sheets, No. 24 gage.....	\$9 10s.
Galvanized sheets, No. 24 gage.....	\$11 10s.

Official Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £

Current dollar equivalent is ascertained by multiplying gold pound price by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.

Billets, Thomas.	\$2 7s.
Wire rods, No. 5 B.W.G.	\$4 10s.
Steel bars, merchant	\$3 5s.
Sheet bars	\$2 8s.
Plate, ¼ in. and up	\$4 2s. 6d.
Plate, 3/16 in. and 5 mm....	\$4 4s. 8d.
Sheets, ½ in....	\$4 9s. 8d.
Beams, Thomas.	\$3 2s. 6d.
Angles (Basic)..	\$3 2s. 6d.
Hoops and strip base	\$4 2s. 6d.
Wire, plain, No. 8	\$5 7s. 6d.
Wire nails	\$5 15s.
Wire, barbed, 4 pt. No. 10 B.W.G.	\$8 15s.

Steel works and rolling mills are operating at capacity with large reserve orders and further enlargement of present capacity essential. Deliveries within a reasonable period are difficult to obtain. Persistent pressure continues for deliveries of billets and sheet bars. Increased British railroad allocations are anticipated, and South Africa is inquiring for rails. Shape and plate mills are busy owing to shipbuilding improvement. Steel makers are keeping their pledge not to increase prices under protection, though rising raw material costs may eventually leave them no alternative. Home demand for tin plate is good. Very little export inquiry exists, but some forward sales have been made. Eighty per cent of recent sales have been made for home account. Unfilled orders amount to only 2,750,000 boxes. Output is at 55 per cent of capacity.

Continental iron and steel market sentiment is improved by the five-year prolongation of the French Comptoir Siderurgique. Business is slightly better, but much below what it was a few weeks ago.

The International Wire Rod Cartel production program for the first quarter calls for 375,000 tons, representing an increase of 15,000 tons over a year ago.

The British Iron & Steel Corp. has been formed by the British Iron and Steel Federation to arrange an agreement between the Federation and the International Steel Cartel and will be concerned with United Kingdom iron and steel imports and regulation and development of exports.

November Pig Iron Output Up 7.9 Per Cent

PRODUCTION of coke pig iron in November totaled 2,065,913 gross tons, compared with 1,978,411 tons in October. The daily rate in November, at 68,864 tons, increased 7.9 per cent over the October rate of 63,820 tons.

There were 122 furnaces in blast on Dec. 1, making iron at the rate of 70,095 tons a day, against 116 furnaces on Nov. 1, making iron at the rate of 67,655 tons a day. Seven furnaces were blown in during the month and one was banked. The Steel Corporation blew in two furnaces, independent steel companies blew in one furnace and banked one, and merchant producers blew in three furnaces. In addition, an independent steel company blew in a merchant furnace.

Among the furnaces blown in were the following: One Clairton, Carnegie-Illinois Steel Corp.; one Ensley, Tennessee Coal, Iron & Railroad Co.; one Sparrows Point furnace, Bethlehem Steel Co.; one Pioneer, Republic Steel Corp.; Standish, Chateaugay Ore & Iron Co.; Zenith, Interlake Iron Corp.; one Woodward, Woodward Iron Co.

Republic Steel Corp. banked a Hasletton furnace for a short time.

Merchant Iron Made, Daily Rate

	Tons			
	1935	1934	1933	1932
January	3,926	7,800	2,602	6,256
February	6,288	7,071	2,863	7,251
March	7,089	7,197	2,412	7,157
April	8,799	8,838	1,908	5,287
May	8,441	9,099	3,129	4,658
June	7,874	9,499	4,088	6,090
July	8,644	7,880	6,783	3,329
August	8,194	6,043	7,756	3,070
September	10,090	4,986	10,034	3,213
October	11,199	5,765	8,634	4,286
November	12,503	6,610	7,639	4,435
December	4,399	8,358	3,674	

Production by Districts and Coke Furnaces in Blast

Furnaces	Production (Gross Tons)		December 1		November 1	
	November (30 Days)	October (31 Days)	Number in Blast	Operating Rate Tons a Day	Number in Blast	Operating Rate Tons a Day
<i>New York:</i>						
Buffalo	140,696	140,447	8	4,690	8	4,940
Other New York and Mass.	21,178	10,978	2	765	1	355
<i>Pennsylvania:</i>						
Lehigh Valley	36,156	36,487	3	1,205	3	1,175
Schuylkill Valley	19,465	20,683	2	650	2	665
Susquehanna and Lebanon Valleys	11,157	11,818	1	370	1	380
Ferromanganese			0		0	
Pittsburgh District	407,431	411,895	23	14,015	22	13,725
Ferro. and Spiegel	9,350	10,030	2	310	2	325
Shenango Valley	35,411	35,240	2	1,180	2	1,135
Western Pennsylvania	47,574	54,399	3	1,585	3	1,755
Ferro. and Spiegel	6,006	6,040	1	200	1	195
Maryland	84,993	78,065	4	3,270	3	2,520
Wheeling District	135,475	139,633	7	4,515	7	4,505
<i>Ohio:</i>						
Mahoning Valley	193,886	187,347	9	6,000	10	7,310
Central and Northern	214,321	190,890	12	7,145	12	6,210
Southern	45,913	46,849	4	1,530	4	1,510
Illinoian and Indiana	412,574	381,641	19	13,750	19	13,630
Mich. and Minn.	78,541	74,243	5	2,710	4	2,395
Colo., Mo. and Utah	22,184	21,660	2	740	2	700
<i>The South:</i>						
Virginia			0		0	
Ferro. and Spiegel	2,889	2,937	1	95	1	95
Kentucky	13,094	13,692	1	435	1	440
Alabama	127,619	103,437	11	4,935	8	3,690
Tennessee			0		0	
Total	2,065,913	1,978,411	122	70,095	116	67,655

Daily Average Production of Coke Pig Iron

	Gross Tons			
	1935	1934	1933	1932
January	47,656	39,201	18,348	31,380
February	57,448	45,131	19,798	33,251
March	57,098	52,243	17,484	31,201
April	55,449	57,561	20,787	28,430
May	55,713	65,900	28,621	25,276
June	51,750	64,338	42,166	20,935
1/2 year	54,138	54,134	24,536	28,412
July	49,041	39,510	57,821	18,461
August	56,816	34,012	59,142	17,115
September	59,216	29,935	50,742	19,753
October	63,820	30,679	43,754	20,800
November	68,864	31,898	36,174	21,042
December		33,149	38,131	17,615
Year	43,592	36,199	23,733	

Production of Coke Pig Iron and Ferromanganese

	Gross Tons		Ferromanganese	
	Pig Iron*		1935	1934
January	1,477,336	1,215,226	10,048	11,703
February	1,608,552	1,263,873	12,288	10,818
March	1,770,028	1,619,534	17,762	17,605
April	1,663,475	1,726,851	18,302	15,418
May	1,727,095	2,042,896	17,541	10,001
June	1,552,514	1,930,133	12,961	10,007
1/2 year	9,799,000	9,798,313	88,902	75,642
July	1,520,263	1,224,826	13,175	10,188
August	1,761,286	1,054,382	12,735	8,733
September	1,776,476	898,043	15,983	7,100
October	1,978,411	951,062	19,007	9,830
November	2,065,913	956,940	18,245	8,134
December		1,027,622	....	4,563
Year	15,911,188	....	124,190	

*These totals do not include charcoal pig iron. The 1934 production of this iron was 25,834 gross tons.

†Included in pig iron figures.

Brazilian and Canadian Trade Agreements Officially Proclaimed

Proclaimed yesterday by the President, United States reciprocal trade agreements with Canada and Brazil will become effective Jan. 1.

The agreement with Canada provides for reduced Canadian tariff rates on virtually all iron and steel products and on a wide range of machinery.

An outstanding change that will take place when the agreements become effective will be reduction of the American duty on manganese ore to 1/2c. a lb., and on ferromanganese to 1c. a lb., manganese content.

Under the Brazilian agreement the reduction in ore duty amounts to 50 per cent under present duty of 1c. a lb. Under the Canadian agreement the ferromanganese duty is reduced to 1 1/4 times the ore duty plus 3/4c. a lb. The present duty on ferromanganese is 1 1/2c. a lb.

PERSONALS

HARRY L. BRINDLE has been appointed assistant general superintendent of the Youngstown district for Carnegie-Illinois Steel Corp. FREDERICK B. QUIGLEY has been appointed general superintendent of the Farrell steel works and furnaces, succeeding Mr. Brindle. The latter started with the Carnegie Steel Co. in 1906 in the roll department of the New Castle, Pa., works. In 1919 he was transferred to the Farrell works as assistant master mechanic, becoming assistant general superintendent in February, 1926, and general superintendent in June, 1931. Mr. Quigley began with the Carnegie Steel Co. in 1908 in the blast furnace department at Youngstown. He was made superintendent of blast furnaces in January, 1917, superintendent of open-hearth and Bessemer department in January, 1922, and assistant general superintendent for the Youngstown district in February, 1927.

◆ ◆ ◆

O. R. WIKANDER, of the Edgar-
water Steel Co., Pittsburgh, has
been awarded the Melville medal
for 1935 by the American Society
of Mechanical Engineers for his
paper, "Draft Gear Action in Long
Trains." The medal, endowed by
Rear Admiral George W. Melville,
past-president of the society, is
awarded when a paper of exception-
al merit is presented to the so-
ciety.

◆ ◆ ◆

W. W. HILL, who since 1912 has
been superintendent of bar mills,
Duquesne steel works of the Car-
negie-Illinois Steel Corp., Pitts-
burgh, has retired. He started his
career in 1887 with the Westing-
house Air Brake Co., leaving in
1889 to become associated with
Aluminum Co. of America, then
known as the Pittsburgh Reduction Co. When the latter com-
pany's plant was removed from
Pittsburgh to New Kensington Mr.
Hill took charge of operations. His
service with Carnegie Steel Co.
began in 1892 at the Homestead
steel works. In 1902 he was trans-
ferred to Duquesne works as su-
perintendent of the shipping de-
partment, becoming superintendent
of bar mills in 1912.

◆ ◆ ◆

D. A. NEMSER, New England
representative of the International
Nickel Co., Inc., is scheduled to ad-

dress the Rhode Island chapter of
the American Society for Metals
at Providence, Dec. 4.

◆ ◆ ◆

ALVIN LIGHT has been appointed
Buffalo representative for the
American Monorail Co., Cleveland.

◆ ◆ ◆

LLOYD LEAVER, who has been
vice-president in charge of sales of
the mechanical rubber goods division
of the Thermoid Rubber Co.,
Trenton, N. J., has resigned. FRED
MATHEIS, who for many years has
been in active charge of the de-
partment routine, has been elected
assistant vice-president and will
continue in charge of the mechan-
ical rubber goods division office. S.
H. LYONS has been appointed East-
ern manager of this department.

◆ ◆ ◆

JOHN R. HERTZLER, heretofore
manager of the air conditioning
division of the New York branch
of the York Ice Machinery Corp.,
York, Pa., has been named man-
ager of the company's air condi-
tioning division.

◆ ◆ ◆

WALTER R. SCOTT, traffic commis-
sioner, Kansas City, Mo., board of
trade, has been elected president
of the National Industrial Traffic
League, which held its twenty-
eighth annual meeting in Chicago
on Nov. 20 and 21. WILLIAM A.
MOORE, general traffic manager,
New Jersey Zinc Co., New York,
was elected vice-president, and ROY
W. CAMPBELL, manager traffic de-
partment, Butler Paper Corp.,
Chicago, was elected treasurer.

◆ ◆ ◆

L. J. BOYER has been placed in
charge of the Cleveland office of
American Sheet & Tin Plate Co.,
succeeding B. J. RICHARDS, who has
been transferred to the company's
Pittsburgh office. Mr. Boyer for-
merly represented the N. G. Taylor
Co., Corrigan, McKinney Steel Co.,
and the Newton Steel Co. in Phila-
delphia.

◆ ◆ ◆

S. L. FELTON, general traffic
manager of the Acme Steel Co.,
has been elected chairman of the
Industrial Traffic Council of the
Chicago Association of Commerce.



H. L. BRINDLE



F. B. QUIGLEY



O. R. WIKANDER

Uniform Gains Raise Capital Goods Index Still Higher

FURTHER pronounced gains in industrial activity were made last week when all factors in THE IRON AGE capital goods index concurred in lifting it to 80.0 per cent of the 1925 to 1927 average. Steel ingot output, at 56 per cent of capacity, was extraordinary, considering the season. On an adjusted basis, therefore, its index has now reached a peak close to 75 per cent of the 1929 average rate. The automobile and construction factors also were instrumental, with activity in the latter field approaching 50 per cent of the boom-year volume.

Revenue freight car loadings are heavier. In particular, shipments

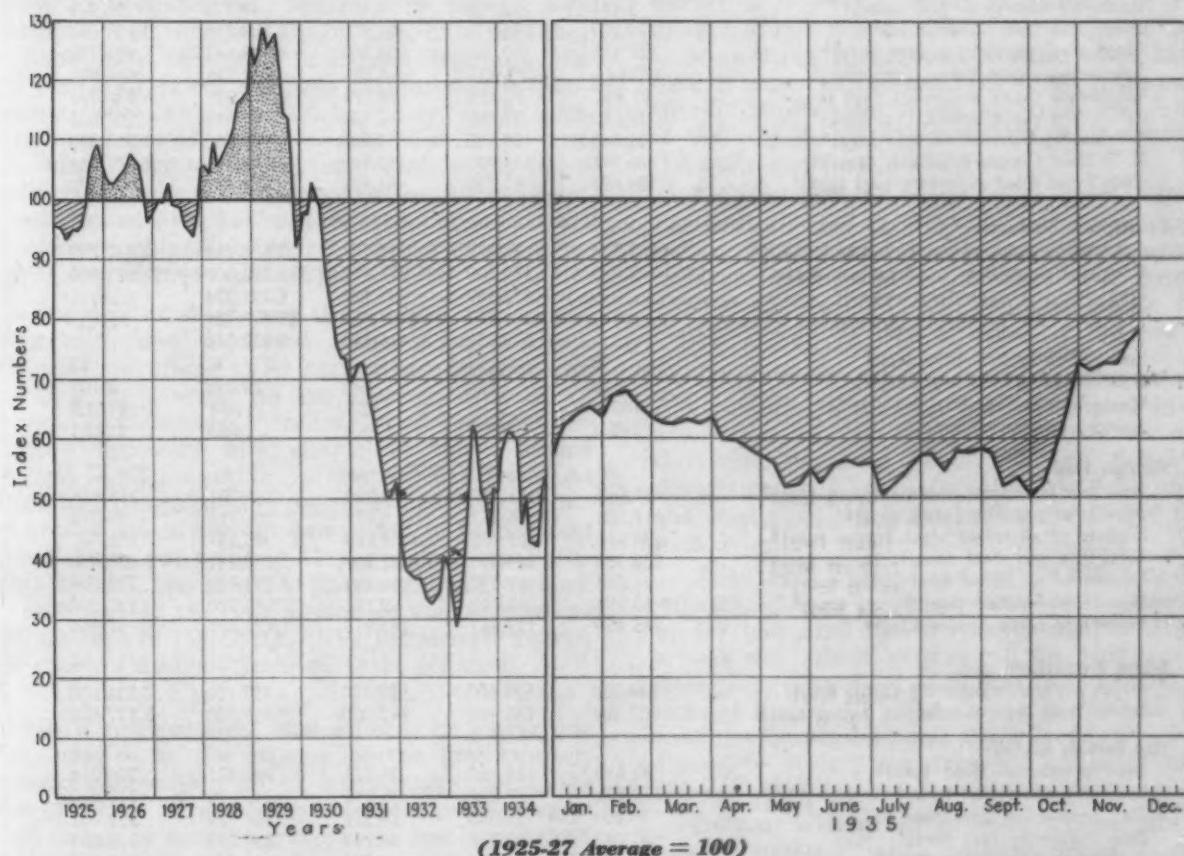
The Iron Age Weekly Index Numbers of Capital Goods Activity

(1925-27 Average = 100)

Last week (est.)	80.0
Preceding week (rev.)	76.8
Same week last month	72.7
Same week 1934	43.4
Same week 1933	47.3
Same week 1932	35.2
Same week 1931	51.7
Same week 1930	78.2
Same week 1929	97.4

of forest products, which until two weeks ago had been declining steadily, abruptly halted this movement and mounted. This development, combined with industrial proceedings in the Pittsburgh area in excess of all previous records for the year, necessitated a greater than normal revision in the composite index figure for two weeks ago.

The fact that the capital goods industries appear still to be making headway, despite previous unusual gains, is all the more encouraging when one considers that in last week's improved business at least five major branches of industry participated.



The Iron Age Index of Capital Goods Activity. The years 1925 to 1934 are plotted by months, the current year by weeks.

Components of the index: Steel ingot production rate, from THE IRON AGE; revenue freight carloadings of forest products, from Association of American Railroads; automobile production, from Cram's Automotive Reports; heavy construction contract awards, from Engineering News Record; index of productive activity in Pittsburgh district, from Bureau of Business Research of University of Pittsburgh.

Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly
as More Recent Figures Are Made Available.

	October, 1935	September, 1935	October, 1934	Ten Months, 1934	Ten Months, 1935
Raw Materials:					
Lake ore consumption (gross tons)*.....	2,917,059	2,654,278	1,306,477	19,309,796	24,726,966
Coke production (net tons)*.....	3,136,351	2,891,530	2,390,200	24,572,700	28,496,747
Pig Iron:					
Pig iron output—monthly (gross tons)*.....	1,978,411	1,776,476	951,000	13,926,626	16,835,436
Pig iron output—daily (gross tons)*.....	63,820	59,216	30,679	45,809	55,380
Castings:					
Malleable castings—production (net tons)*.....	43,467	36,996	25,317	308,197	339,524
Malleable castings—orders (net tons)*.....	45,246	35,658	18,785	289,111	362,260
Steel castings—production (net tons)*.....	.....	35,411	29,142	400,372	.....
Steel castings—orders (net tons)*.....	.....	29,995	24,327	385,267	.....
Steel Ingots:					
Steel ingot production—monthly (gross tons)*..	3,116,184	2,829,835	1,481,902	22,024,236	27,160,260
Steel ingot production—daily (gross tons)*..	115,414	113,193	54,885	84,709	104,463
Steel ingot production—per cent of capacity*..	52.13	51.13	24.93	38.47	47.19
Employment in Steel Industry:					
Total employees*.....	.....	424,779	381,431	414,418	.....
Total payrolls (thousands of dollars)*.....	.....	\$45,473	\$32,724	\$389,543	.....
Average hours worked per week*.....	.....	34.0	25.4	31.1	.....
Finished Steel:					
Trackwork shipments (net tons)*.....	3,495	2,962	2,153	44,773	36,114
Sheet steel sales (net tons)*.....	226,209	196,423	102,920	1,504,208	1,981,070
Sheet steel production (net tons)*.....	222,963	190,701	104,898	1,592,663	1,991,763
Fabricated shape orders (net tons)*.....	100,841	83,007	64,723	897,338	865,505
Fabricated shape shipments (net tons)*.....	91,901	98,824	124,179	916,975	920,223
Fabricated plate orders (net tons)*.....	30,530	31,105	16,581	199,338	203,615
Reinforcing bar awards (net tons)*.....	31,865	109,835	9,510	162,505	363,240
U. S. Steel Corp. shipments (tons)*.....	686,741	614,933	343,962	5,141,124	6,027,964
Ohio River steel shipments (net tons)*.....	104,659	92,898	46,475	534,600	776,170
Fabricated Products:					
Automobile production, U. S. and Canada*.....	283,334	95,128	135,771	2,628,466	3,349,790
Construction contracts, 37 Eastern States*.....	\$200,863,700	\$167,376,200	\$125,224,800	\$1,338,732,000	\$1,392,561,400
Steel barrel shipments (number)*.....	.....	622,187	575,281	5,791,234	.....
Steel furniture shipments (dollars)*.....	.....	\$1,361,449	\$997,859	\$9,678,721	.....
Steel boiler orders (sq. ft.)*.....	.....	575,031	415,713	3,822,066	.....
Locomotive orders (number)*.....	0	7	5	91	28
Freight car orders (number)*.....	810	110	75	23,075	8,103
Machine tool index*.....	102.9	80.0	43.9	†40.5	†102.9
Foundry equipment index*.....	140.0	128.4	55.3	†48.3	†127.1
Foreign Trade:					
Total iron and steel imports (gross tons)*.....	59,569	53,158	20,250	261,781	358,824
Imports of pig iron (gross tons)*.....	17,168	14,357	6,682	105,773	99,098
Imports of all rolled steel (gross tons)*.....	24,444	22,970	9,268	95,237	176,782
Total iron and steel exports (gross tons)*.....	238,358	244,419	220,209	2,250,846	2,622,825
Exports of all rolled steel (gross tons)*.....	81,248	63,898	68,394	791,879	724,151
Exports of finished steel (gross tons)*.....	63,954	58,893	60,187	695,020	620,507
Exports of scrap (gross tons)*.....	145,850	173,852	147,213	1,422,627	1,797,468
British Production:					
British pig iron production (gross tons)*.....	544,300	529,600	527,100	4,957,400	5,336,600
British steel ingot production (gross tons)*.....	907,300	855,900	812,000	7,439,200	8,127,600
Non-Ferrous Metals:					
Lead production (net tons)*.....	42,618	34,350	35,576	340,421	304,014
Lead shipments (net tons)*.....	42,271	37,232	35,943	313,490	310,460
Zinc production (net tons)*.....	36,701	36,088	34,527	351,579	353,753
Zinc shipments (net tons)*.....	47,063	42,217	30,294	359,035	375,804
Deliveries of tin (gross tons)*.....	5,355	5,360	2,925	36,840	49,715

* Preliminary. † Three Months' Average.

Source of figures: * Lake Superior Iron Ore Association; ^b Bureau of Mines; ^c THE IRON AGE; ^d Bureau of the Census; ^e American Iron and Steel Institute; ^f National Association of Flat-Rolled Steel Manufacturers; ^g American Institute of Steel Construction; ^h United States Steel Corp.; ⁱ United States Engineer, Pittsburgh; ^j When preliminary, from Automobile Manufacturers Association—Final figures from Bureau of the Census; ^k F. W. Dodge Corp.; ^l Railway Age; ^m National Machine Tool Builders Association; ⁿ Foundry Equipment Manufacturers Association; ^p Department of Commerce; ^r British Iron and Steel Federation; ^s American Bureau of Metal Statistics; ^t American Zinc Institute, Inc.; ^u New York Commodities Exchange.

Pig Iron Production Up 7.9 Per Cent in November

Ingot Rate, Now 57 Per Cent, Is Highest Since June, 1934—Steel Demand Holds Despite Reaffirmation of Prices

PIG iron production in November totaled 2,065,913 tons, or 68,864 tons a day, compared with 1,978,411 tons, or 63,820 tons daily, in October. The gain, in terms of daily rate, was 7.9 per cent. Furnaces in blast on Dec. 1 numbered 122, as against 116 Nov. 1, a net increase of six. The production rate Dec. 1 was 70,095 tons per day, compared with 67,655 tons one month previous.

STEEL production, despite the failure of a broad advance of finished steel prices to develop, continues to rise. At 57 per cent, one point higher than last week, ingot output is at the highest level since the third week in June, 1934, when production was sharply stimulated by forward covering prior to an increase in code prices. Anticipatory buying may have helped swell current tonnage, though the fact that operations have continued to expand following the reaffirmation of prices suggests that protective commitments were not heavy. In many cases such orders were merely tentative, scheduled to go into effect when word came through that prices were actually being advanced. Pressure for deliveries of finished steel on order has been relieved, but few buyers have ordered shipments suspended, notwithstanding the approach of the inventory period.

In the case of sheet steel the specifications of the leading mill have increased rather than declined, raising its operations to 80 per cent of capacity and sustaining the average for the sheet industry at 75 per cent. At Chicago a leading steel producer has postponed necessary mill alterations for a second time, and ingot output in the district has risen one and one-half points to 63½ per cent of capacity. Raw steel production is also up two points to 60 per cent in the Valleys, one point to 41 per cent in the Philadelphia district, two points to 82 per cent at Cleveland, nine points to 42 per cent at Buffalo and four points to 50 per cent in the South. The Pittsburgh district alone shows a decline—from 46 to 44 per cent.

THOUGH finished steel production is no longer due for inflation at the expense of the first quarter, the same cannot be said of semi-finished steel, the prices of which were recently advanced. Stocking at the old prices by non-integrated mills has been heavy, with the result that the new quotations will remain nominal, even after the turn of the year. The advance of \$2 a ton in the price of skelp has been followed by the imposition of extras, the first to be applied to skelp. The base on the new card covers widths over 12 in., regardless of gage. As the widths and gages diminish the extras increase, reaching a maximum of 0.325c. a lb. for widths over 1 in. up to 1½ in. and gages from 0.067 to 0.061 in. In general, the extras

are about one-half of those applying on hot-rolled strip.

The only price changes on finished steel that survived the last-minute collapse of the general advance scheduled for a week ago are increases of \$1 a ton on track bolts, \$4 a ton on track spikes, \$4 a ton on fence posts and \$3 a ton on cold-finished bars. In the case of the last named product the increase, which is to become effective Jan. 1, is partly offset by reduced chemical composition extras. Bolts and nuts also have been advanced for first quarter, the larger sizes about 10 per cent and the smaller 3 per cent.

THE automobile industry is still placing steel in large volume, although it is now content to accept deliveries of certain orders in January or February instead of this month. Motor car output in December is now estimated at 350,000 cars, while the year's total is expected to exceed 4,000,000. The accumulation of burdensome stocks of "trade-ins" by dealers is the only factor likely to hold back production in the early months of next year.

Railroad demand continues to grow. The Union Pacific has closed for 100,000 tons of rails and accessories, the Chicago Great Western has bought 14,000 tons, and the Delaware, Lackawanna & Western has ordered 13,000 tons. The Southern Pacific is in the market for 40,769 tons of rails.

ASHARP increase in orders for structural steel, reinforcing steel and cast iron pipe is in prospect after Dec. 15, the deadline for bids on numerous Government-financed jobs. The Los Angeles water department has asked for alternate bids on precast and steel pipe, the latter calling for 27,000 to 35,000 tons.

Structural steel awards of 16,425 tons compare with 23,100 tons in the previous week. New projects up for bids total 23,800 tons, as against 21,250 tons a week ago. Plate lettings call for 3400 tons. Sheet steel piling awards of 5640 tons include 4600 tons for locks at Peoria, Ill. The placing of 330 tons of piling with the Carnegie-Illinois Steel Corp. completes purchases to replace the recently rescinded order for German steel for the Triborough bridge, New York.

Despite widespread protests against the use of foreign steel for public projects, prices on American piling have broken rather sharply on a large Florida project. Concrete bar prices likewise are irregular.

THE IRON AGE scrap composite is holding at \$13.25 a gross ton. Such changes in scrap prices as there are—limited to a few scattered items—are uniformly upward. The finished steel and pig iron composites are unaltered at 2.130c. a lb. and \$18.84 a gross ton respectively.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous;
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

	Dec. 3,	Nov. 26,	Nov. 5,	Dec. 4,
Per Gross Ton:	1935	1935	1935	1934
No. 2 fdy., Philadelphia.....	\$21.3132	\$21.3132	\$21.3132	\$20.26
No. 2, Valley furnace.....	19.50	19.50	19.50	18.50
No. 2 Southern, Cin'ti.....	20.2007	20.2007	20.2007	19.13
No. 2, Birmingham†.....	15.50	15.50	14.50	14.50
No. 2 foundry, Chicago*.....	19.50	19.50	19.50	18.50
Basic, del'd eastern Pa.....	20.8132	20.8132	20.8132	19.76
Basic, Valley furnace.....	19.00	19.00	19.00	18.00
Malleable, Chicago*.....	19.50	19.50	19.50	18.50
Malleable, Valley.....	19.50	19.50	19.50	18.50
L. S. charcoal, Chicago.....	25.2528	25.2528	25.2528	24.04
Fermomanganese, seab'd car-lots	85.00	85.00	85.00	85.00

†This quotation is for delivery in South; in the North prices are 38c. a ton under delivered quotations from nearest Northern furnace.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Finished Steel

Per Lb.:	Dec. 3,	Nov. 26,	Nov. 5,	Dec. 4,
	1935	1935	1935	1934
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	2.40	2.40	2.40	2.40
Hot-rolled annealed sheets, No. 24, Gary.....	2.50	2.50	2.50	2.50
Sheets, galv., No. 24, P'gh.....	3.10	3.10	3.10	3.10
Sheets, galv., No. 24, Gary.....	3.20	3.20	3.20	3.20
Hot-rolled sheets, No. 10, Gary.....	1.85	1.85	1.85	1.85
Hot-rolled sheets, No. 10, Gary.....	1.95	1.95	1.95	1.95
Wire nails, Pittsburgh.....	2.40	2.40	2.40	2.60
Wire nails, Chicago dist. mill.....	2.45	2.45	2.45	2.65
Plain wire, Pittsburgh.....	2.30	2.30	2.30	2.30
Plain wire, Chicago dist. mill.....	2.35	2.35	2.35	2.35
Barbed wire, galv., Pittsburgh dist. mill.....	2.80	2.80	2.80	3.00
Tin plate, 100 lb. box, P'gh.....	\$5.25	\$5.25	\$5.25	\$5.25

Rails, Billets, etc.

Per Gross Ton:				
Rails, heavy, at mill.....	\$36.37 1/2	\$36.37 1/2	\$36.37 1/2	\$36.37 1/2
Light rails, Pittsburgh.....	35.00	35.00	35.00	35.00
Rerolling billets, Pittsburgh.....	29.00	29.00	27.00	27.00
Sheet bars, Pittsburgh.....	30.00	30.00	28.00	28.00
Slabs, Pittsburgh.....	29.00	29.00	27.00	27.00
Forging billets, Pittsburgh.....	35.00	35.00	35.00	32.00
Wire rods, Pittsburgh.....	40.00	40.00	38.00	38.00
Cents	Cents	Cents	Cents	
Skelp, grvd. steel, P'gh, lb.....	1.80	1.80	1.70	1.70

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.85	1.85	1.85	1.80
Bars, Chicago.....	1.90	1.90	1.90	1.85
Bars, Cleveland.....	1.90	1.90	1.90	1.85
Bars, New York.....	2.20	2.20	2.20	2.13
Plates, Pittsburgh.....	1.80	1.80	1.80	1.80
Plates, Chicago.....	1.85	1.85	1.85	1.85
Plates, New York.....	2.09	2.09	2.09	2.08
Structural shapes, Pittsburgh.....	1.80	1.80	1.80	1.80
Structural shapes, Chicago.....	1.85	1.85	1.85	1.85
Structural shapes, New York.....	2.06 1/4	2.06 1/4	2.06 1/4	2.05 1/4
Cold-finished bars, Pittsburgh.....	1.95	1.95	1.95	2.10
Hot-rolled strips, Pittsburgh.....	1.85	1.85	1.85	1.85
Cold-rolled strips, Pittsburgh.....	2.60	2.60	2.60	2.60

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

Finished Steel

Dec. 3, 1935	2.130c. a Lb.
One week ago	2.130c.
One month ago	2.130c.
One year ago	2.124c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products represent 85 per cent of the United States output.

Pig Iron

\$18.84 a Gross Ton
18.84
18.84
17.90

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap

\$13.25 a Gross Ton
13.25
12.58
10.92

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

HIGH	LOW	HIGH	LOW	HIGH	LOW
2.130c., Oct. 1;	2.124c., Jan. 8	\$18.84, Nov. 5;	\$17.83, May 14	\$13.25, Nov. 26;	\$10.33, April 23
2.199c., April 24;	2.008c., Jan. 2	17.90, May 1;	16.90, Jan. 27	13.00, Mar. 13;	9.50, Sept. 25
2.015c., Oct. 3;	1.867c., April 18	16.90, Dec. 5;	13.56, Jan. 3	12.25, Aug. 8;	6.75, Jan. 3
1.977c., Oct. 4;	1.926c., Feb. 2	14.81, Jan. 5;	13.56, Dec. 6	8.50, Jan. 12;	6.43, July 5
2.037c., Jan. 13;	1.945c., Dec. 29	15.90, Jan. 6;	14.79, Dec. 15	11.33, Jan. 6;	8.50, Dec. 29
2.273c., Jan. 7;	2.018c., Dec. 9	18.21, Jan. 7;	15.90, Dec. 16	15.00, Feb. 18;	11.25, Dec. 9
2.317c., April 2;	2.273c., Oct. 29	18.71, May 14;	18.21, Dec. 17	17.58, Jan. 29;	14.08, Dec. 3
2.286c., Dec. 11;	2.217c., July 17	18.59, Nov. 27;	17.04, July 24	16.50, Dec. 31;	13.08, July 2
2.402c., Jan. 4;	2.212c., Nov. 1	19.71, Jan. 4;	17.54, Nov. 1	15.25, Jan. 11;	13.08, Nov. 22

Ingot Rate Drops Two Points at Pittsburgh



But Operations Rise in Valleys and Hold in Wheeling District—Cold-Finished Bars Advanced \$3 a Ton

PITTSBURGH, Dec. 3.—Important producers in this district have opened books for first quarter business. With the exception of track spikes and track bolts and cold-finished bars, all finished steel quotations remain unchanged for the coming period. The advances recently announced on semi-finished steel grades are only nominally effective, and pressure from non-integrated mills, which presumably will be faced with higher costs in first quarter, may possibly force some revisions later.

The sudden abandonment of the move to increase finished steel prices for first quarter has not visibly affected steel demand here and finishing mill schedules have not lost pace in the past week. Fairly heavy flat-rolled steel commitments for December probably will engage sheet and strip mills steadily through the month. In the Pittsburgh area, however, some significance may be attached to lower ingot production schedules this week, which for the district will fall two points to 44 per cent of capacity. A reversed trend this week has pushed raw steel output in the Valleys and nearby northern Ohio mills two points higher to 60 per cent. Steadiness characterizes activity in the Wheeling district, which is unchanged at 80 per cent.

Pig Iron

Shipments against fourth quarter contracts are relatively heavy, but it seems likely now that a goodly portion of present deliveries is being stocked and first quarter will find some consumers indifferent to new commitments. Exceptions are non-integrated steel mills and mill equipment makers, whose intake of pig iron is largely for immediate consumption. Heating equipment plants also are sharing prominently in the present movement. Higher quotations established Nov. 1 remain nominal.

Semi-Finished Steel

Producers have opened books for acceptance of first quarter business

at the recently established higher quotations. The Pittsburgh wire rod base price of \$40 a gross ton, which was set for the remainder of fourth quarter, also has been extended for first quarter shipment. Meanwhile most non-integrated users have covered beyond their normal early requirements, and the new prices will remain largely nominal even after the turn of the year. The advanced rerolling billet price is under pressure from non-integrated mills, which have not reflected the increase in their finished steel prices, and there is some doubt expressed as to whether the advance will be maintained. In the case of skelp, the increased price of 1.80c. is expected to eliminate price cutting in finished tubular goods among some small detached pipe mills.

Bolts, Nuts and Rivets

November volume fell slightly below October business, despite a pick-up in automotive and railroad demand.

Rails and Track Accessories

Track bolts have been advanced \$1 a ton to \$3.60, base per 100 lb. Most carriers are specifying freely against fourth quarter orders for spikes and track bolts at the old prices. Demand for these items also has been increased by recent large-sized rail purchases.

Reinforcing Steel

Although a large amount of figuring continues, mills are beginning to feel the effects of seasonal trends. Inclement weather also is slowing releases against orders. Grade crossing elimination work thus far centers chiefly in New York, but is expected to spread next spring to many other States. Bids will be taken next week at Los Angeles for a number of FERA projects, entailing an estimated requirement of 15,000 tons of reinforcing steel, which the Federal Government will buy

direct. In view of the extension of the present hot-rolled bar price for first quarter, no change in reinforcing steel for that period will be made, and efforts of producers will be aimed at stabilizing the present market.

Plates and Shapes

A large tonnage of plates is being figured for barge construction, which, however, in a large measure represents tentative interest that lacks definite assurance of financial support. The railroads are more actively interested, but only small placements are being made for tank construction.

New structural projects reported here were mainly for State highway construction. The long heralded grade crossing elimination program is creeping ahead, with specifications for many small projects of this character now promising early maturity. The American Bridge Co. will furnish 2340 tons for New York Central depressed track bridge work at New York.

Plates and shapes are being quoted at an unchanged base of 1.80c. a lb., Pittsburgh, for first quarter delivery.

Cold-Finished Bars

A leading Pittsburgh producer is announcing tomorrow that the base price, effective Jan. 1, for first quarter will be advanced \$3 a ton to 2.10c. a lb., Pittsburgh. Effective the same date, a general revision, representing a \$3 a ton drop, will be made in the chemical composition extras which will be as follows, per 100 lb.: Bessemer screw stock, standard analysis, base; open-hearth screw stock, standard analysis, 10c.; high-manganese open-hearth screw stock not exceeding 0.25 per cent carbon, minimum manganese 0.80 per cent, maximum 1.55 per cent, 20c.; high-manganese open-hearth screw stock, carbon 0.26 to 0.50 per cent, manganese minimum 0.80 per cent, maximum 1.65 per cent, 35c.; S.A.E. specifications 1010 to 1025 inclusive, base; S.A.E. specifications 1030 to 1050 inclusive, 10c. The remaining four brackets of extras for chemical composition will be unchanged. A slight revision in the application of extras for accuracy also will be made effective for first quarter.

Bars

The present base price of 1.85c. a lb., Pittsburgh, is being quoted for first quarter delivery, thus upsetting previous expectations of a \$3 a ton increase. Since announcement of an unchanged base for next quarter, fluctuation in demand has been practically unno-

ticeable. Forging shops and other lines incidental to automobile manufacture are the heaviest buyers at this time, with miscellaneous users providing a substantial share of current business. Purchases in anticipation of higher prices are not believed to have spread to a point where stocks greatly exceed December and part of January needs.

Tubular Goods

Temporarily, at least, discussions of price changes have subsided and producers are quoting present prices and discounts for first quarter. The problem of some small non-integrated mills, which must absorb higher skelp and tube round prices in first quarter if advances established on those items are maintained, has not yet been solved. Demand, in the meantime, has slipped slightly. November bookings, in some instances, fell 5 per cent below October orders, despite an increase in mechanical tubing shipments for automobile consumption.

Sheet Steel Piling

Although no official announcement has been made, at least one important Pittsburgh producer is quoting the present base of 2.15c. a lb. for first quarter. Demand is beginning to show seasonal trends, and, while shipments against orders are sustained, new specifications are in smaller volume.

Wire Products

The extension of present prices for first quarter delivery has not affected general demand, which is unusually well sustained from diversified manufacturing lines, notably the automobile industry. Merchant trade also is surprisingly good for the season. Although the threat of higher prices has been removed for the time being, some producers believe that changes may be made some time late in first quarter. For first quarter, bright

wire is quotable at 2.30c., spring wire at 2.90c. per lb., and wire nails at \$2.40 base per keg, Pittsburgh.

Sheets

All present sheet prices are being quoted for first quarter shipment. Despite the sudden decision of producers not to raise prices for that period, specifications are unusually steady, and in only a few instances has deferment of shipments been requested. A large producer here in November enjoyed the heaviest monthly tonnage for any period since 1929. Specifications from the automobile industry are increasing moderately, with little change in miscellaneous demand. With the leading producer scheduled this week at about 80 per cent, operations probably will be sustained at 75 per cent of capacity for the sheet industry.

Tin Plate

The behavior of operations still is an enigma in the face of the season, heavy stocks and the reaffirmation of the present quotation of \$5.25 per base box, Pittsburgh. In the current week, operations at around 65 to 70 per cent are strongly supported by a rate of 79 per cent of the leading producer. Production and shipment of tonnage against next year's orders are accounting for a goodly share of current activity, which is further enlivened by a fair demand for export and general line can requirements.

Strip Steel

Present prices of 1.85c. for hot-rolled strips and 2.60c. for cold-rolled strips, Pittsburgh, are being quoted for first quarter shipment. Demand has diminished slightly since the abandonment last week of a general price increase on finished steel, and producers attribute this trend to a small speculative movement prior to the settlement of the price question.

Automobile demand is running well ahead of that from other sources and is a bulwark in sustaining hot and cold-rolled strip operations at an average of 55 per cent.

Coal and Coke

Snow storms in the Tri-State district have sharpened consumer interest in domestic-sized fuels. Industrial demand also seems to have roused slightly from its lethargy, but the entire market still is not regarded as active. Domestic coke and coal prices are fairly firm under support of demand, while steam coals and furnace and foundry coke quotations are subject to concessions.

Scrap

Increased demand for No. 2 heavy melting steel has pushed this item 25c. a ton higher. All other grades remain quotably unchanged. Indications of underlying strength are found in the apparent scarcity of scrap from small yard dealers, who are forcing broker bids to higher levels in some cases. On \$14 heavy melting steel orders covering, prices are ranging as high as \$13.75. A large tonnage of heavy breakable cast is reported to have been sold to an independent steel maker at \$13, the same price paid on the last sizeable transaction. The Pennsylvania Railroad has issued scrap lists covering about 50,000 tons, including 23,400 tons of No. 1 steel and 10,000 tons of axles. This offering of scrap is the largest since 1929 and represents material salvaged under the Pennsylvania's huge car dismantling program, which is reported to entail about 30,000 freight cars. The heavy tonnage offered is not expected to depress the scrap market, since it is believed quite possible that a goodly share will be absorbed by one or two mills, with small items taken by dealers.

Weekly Indications of Steel Activity

From THE IRON AGE

	Dec. 3, 1935	Nov. 26, 1935	Nov. 5, 1935	Dec. 4, 1934	Average Year to Date 1935	1934
Steel ingot operations—Per cent of capacity	57.0	56.0	52.5	29.5	47.7	37.3
Week Ended						
	Dec. 3, 1935	Nov. 26, 1935	Nov. 5, 1935	Dec. 4, 1934	Average Year to Date 1935	1934
Fabricated structural steel awards.....	16,425	23,000	23,100	3,850	683,560	720,705
Fabricated plate awards.....	3,400	1,530	1,255	450	35,652	113,722
Sheet steel piling awards.....	5,650	180	2,000	26,160	60,820	73,610
Reinforcing bar awards.....	3,625	6,700	1,510	900	290,465	175,591

Chicago Rate in Further Rise to 63½ Per Cent



Collapse of Projected Price Advances Fails to Check Demands on the Mills—Railroad Buying Expands

CHICAGO, Dec. 3.—All books are open for the first quarter and, with the exception of quotations on semi-finished steel, price changes are limited to a \$4 a ton advance on track spikes, a \$1 increase on track bolts and a \$4 advance on steel fence posts.

Specifications against old commitments are heavier and new buying, much of it for delivery in the new year, is establishing a record which has not been exceeded since last January. The pressure for steel is clearly shown by the fact that ingot output has risen one and one-half points to 63½ per cent of capacity, and mill alteration work that had already been postponed to the first week in December has now been set ahead to the Christmas holiday period.

Plans for additional rolling mill capacity continue to move forward with announcement that new rod mills will be constructed at Joliet, after which may follow extensive alterations to wire mills in this area.

Railroad news continues to command attention. The Union Pacific and the Chicago Great Western have ordered rails, and now the Illinois Central announces a heavy equipment repair program.

The inventory period is at hand and its influence is already felt, particularly in so far as jobbers are concerned.

Coke

By-product foundry coke prices at \$9 a ton, for delivery outside the Chicago switching district, are being extended for December shipments. The movement in November topped October by 15 per cent, but, because of the holiday period, December shipments are expected to drop back.

Pig Iron

The spot car buying phase has been left behind, and first quarter contracting is making its appearance in a substantial way. A buying rush is not looked for, inasmuch as fourth quarter contracts

more than covered requirements for the period and there will be some carry-over into the new year.

November shipments exceeded those in October by 20 per cent and the December movement is expected to reach a new high point, not necessarily because of heavier melt, which will probably drop during the holiday and inventory periods, but because most contracts represent low-priced iron, and buyers will take commitments in full.

Sheets

Hot mills are still being pressed by new business and bookings now extend well into January on many products. The pressure is such that one producer who had planned some extensive mill alterations has



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again postponed the work. Jobbers are moving large quantities of sheets and they remain actively in the market. Specifications from farm implement manufacturers show that their requirements have not diminished as winter has advanced. The galvanized product is comparatively slow, but sellers expect a sharp revival in interest in the late winter.

Wire

Output, under the leadership of manufacturers' wire, has climbed about five points to a range from 60 to 65 per cent of capacity. Books are open for the first quarter and buying is in fair volume despite the fact that orders came in fast when the price advance threat overhung the market. Order books are of the size that readily lead to the conclusion that much tonnage now on order will be carried forward into the first quarter. Specifications entered in December will be delivered in the new year without the code formality of extra paper work at the year's end. Jobbers are now faced with the inventory period and are comparatively inactive, but their needs for stock are growing. Steel fence posts are being marked up \$4 a ton.

Rails

The Union Pacific has ordered 70,000 tons of rails from the Carnegie-Illinois, Inland and Colorado mills. The Chicago Great Western has placed 14,000 tons of rails and accessories with Carnegie-Illinois and Inland, and frog and switch

makers have ordered 500 tons of rails. There are still a number of Western railroads to be heard from in regard to rails and it is understood that most of them are busily engaged in submitting estimates for approval. The Santa Fe is in the market for a round tonnage of spikes.

Plates

Interest in this market centers in the release of WPA funds, which will provide many small municipalities with new water tanks, and also in railroad plans for the purchase of new equipment and the repair of old cars. The Illinois Central will use a \$3,000,000 loan to repair 141 locomotives, 56 passenger cars and over 4500 freight cars. In the meantime the Burlington is ordering out more materials for the cars it is building in its own shops.

Bars

Purchasing is active and specifications are growing in practically all branches of this market. Forgers are particularly busy on tractor and automobile parts, and liberal bar tonnages are moving into automobile manufacturing centers. Miscellaneous demand remains steady. Production on bar mills easily tops the output of either plate mills or structural units.

Cast Iron Pipe

The rush of WPA work, brought about by the Dec. 15 deadline, now has cast iron pipe manufacturers entwined in its meshes. Contract

tors' calls for prices are so frequent that preparation of quotations presses sellers to the limit. Most of the recent awards have come from Government procurement offices which are buying pipe for delivery to communities where free labor is to be furnished. Prices remain very strong. There is much talk of advances, but so far no direct action has been taken.

Reinforcing Bars

A dental building in Chicago, requiring 650 tons, and a Milwaukee housing project, which calls for 850 tons, form the bulk of new awards. The pending list, bolstered by WPA jobs, continues to grow and contractors cannot figure fast enough to keep abreast of new requests for prices. The deadline is Dec. 15, and it cannot be met on the bulk of WPA work. There is talk of setting a new date, but definite action has not been taken. Some of the bids taken on bars for soil erosion projects in Wisconsin have been thrown out. A small tonnage has been ordered for foundations for the first of Chicago's housing projects. Prices for reinforcing bars are showing some semblance of stability.

Structural Material

Mills report that both new business and specifications for structural materials have again reached a new high for the early winter season. Most of the WPA work that has reached fabricators has been small, but several large Government-financed projects are in the making. For instance, the Outer Drive at Chicago may take as high as 16,000 tons of shapes and probably 6000 tons of reinforcing bars. Both Illinois and Indiana are again asking for prices on overhead crossings. The Burlington has placed 700 tons for bridges with the American Bridge Co.

Scrap

The market went into a flurry when one mill which contemplated lower production because of extensive repairs slowed down acceptances. However, the pressure for steel necessitated postponement of the repair work and the scrap market has regained its balance, and prices once again have taken on a stronger tone. Dealers are paying close to \$14 a gross ton delivered for heavy melting steel. Practically all foundry units, with the exception of electric foundries, are busy and are making liberal use of scrap.

Bethlehem to Start New Lackawanna Mill

BUFFALO, Dec. 2.—Hot rolling operations at the new \$20,000,000 strip mill of the Bethlehem Steel Co., at Lackawanna, N. Y., will begin some time this month, with the builders hopeful that they will be in shape for production on Dec. 15. Cold rolling will not start till the latter part of January.

Machinery weighing 38,640,000 lb. now stands in the hot mill department, and when in operation will be capable of taking a slab of steel, 5 in. thick, either 7½ or 15 ft. long and up to 50 in. wide, and roll it into a strip 600 ft. long, 0.005 in. thick and up to 72 in. wide, or a plate 0.5 in. thick.

The hot rolling department will produce, without cold finishing, steel for automobile frames, containers, oil drums, etc., while the cold-finishing department, taking the coils from the hot mill will produce automobile fenders, hood tops, general automobile parts, metal furniture, radios, etc.

Strips off the hot mill to be made into tin plate will be sent to the Sparrows Point, Md., plant.

When the plant is working full, it will turn out 60,000 tons of sheet steel a month, compared with the 12,000 tons at Bethlehem's Seneca sheet division.

Output Rises In South

BIRMINGHAM, Dec. 3.—Since the advance of \$1 a ton on Nov. 23, pig iron buying has been light. Anticipating an increase, practically all southern foundries covered their requirements for the remainder of the year in October and early November. Just before the mark-up, a number of foundries bought additional amounts. It is likely that a substantial portion of this quarter's purchases will be stocked for first quarter use, as the current melt is not on the same high level as buying. Sales this quarter have been the best of any fourth quarter for the past four or five years.

Steel buying continues satisfactory and there is a good run of miscellaneous orders.

Advances have been announced for track material, effective Jan. 1. Spikes will be increased from 2.40c. to 2.60c. a lb.; track bolts from 3.55c. to 3.60c. Rails, tie plates and angle bars are unchanged.

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THE CATALOG

NO. IS H301

No. 178



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LANDIS TOOL CO.
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Eleven blast furnaces are operating in the district, the largest number since June, 1931. On Wednesday of last week Republic Steel Corp. returned its No. 2 furnace to production. This had been banked on Nov. 21 for minor repairs. Tennessee Coal, Iron & Railroad Co. is operating four on basic, two being at Fairfield and two at Ensley. Woodward Iron

Co. has three on foundry, Republic Steel Corp., two on foundry, and Sloss-Sheffield Steel & Iron Co., two on foundry.

Twelve open-hearths were worked last week and the same number will again produce this week. The Tennessee company has five at Fairfield and three at Ensley; Gulf States Steel Co., four at Alabama City.

Pressure for Steel Deliveries Relieved at Cleveland



But Decline in New Business Is Slight
—Ingot Rate Rises Two Points to 82
Per Cent—Bolts and Nuts Advanced

CLEVELAND, Dec. 3.—New business in finished steel has shown a slight decline since present prices were reaffirmed for the first quarter, and pressure for deliveries has been relieved. However, few consumers have ordered shipments suspended. Apparently not a great deal of steel had been ordered for stock in anticipation of price advances. If advances had been made, orders booked during December doubtless would have been much in excess of the capacity of mills to roll this month, and considerable tonnage taken at present prices for delivery at convenience of mills would have been carried over until January.

The slight slowing down in business has not adversely affected production of raw steel. Instead ingot output this week has advanced two points in the Cleveland-Lorain district to 82 per cent of

capacity. Republic Steel Corp. added two open-hearth furnaces and is now operating all 14 in its Corrigan, McKinney plant. One Otis furnace was taken off.

The volume of business from the automotive industry has been little affected by the stabilization of prices. Motor car manufacturers have not been ordering steel for extended requirements, as they wish to avoid excessive inventories. Sheet mills have on order about all the tonnage they can roll this month, and with the opening of books for the first quarter some automotive consumers have ordered sheets and strip steel for January delivery. No interest is being shown as yet in first quarter contracts.

With new public work coming out, the structural steel and reinforcing bar markets show some improvement.

Pig Iron

Shipping orders have continued to increase and considerably more iron will be taken by foundries this month than in November. While some iron is being put in stock because of the \$1 a ton price advance on new business, much of the iron that is being shipped is for current requirements. An increasing amount is being consumed by automobile foundries. Orders are good from stove manufacturers, who continue quite busy. Practically all consumers are expected to specify this month for all the iron covered by their outstanding lower price contracts. Books were opened Dec. 2 for the first quarter at the higher price and a few contracts have been closed.

Bars, Plates and Shapes

Demand for bars continues good, although there has been a slight slackening in orders since present prices were reaffirmed for the coming quarter. Forge shops and other plants making automotive parts are taking a great deal of steel, and agricultural implement manufacturers are ordering freely. In the structural field considerable school work is coming out in Ohio, most of the jobs taking small lots. Cleveland will take bids shortly for 12 school additions requiring 700 tons of shapes and 250 tons of reinforcing bars. Demand for small lots of reinforcing bars for WPA projects has taken a spurt. For a water purification plant in Cincinnati, requiring 1400 tons, bids will be taken Dec. 13. Plates are quiet.

Sheets

New demand has fallen off somewhat since the announcement that present prices have been reaffirmed for the first quarter, and there is less pressure for deliveries on the part of some consumers. However, there have been no requests to hold up shipments. Some new business has been taken for January shipment. Sheet mills state that motor car manufacturers have been avoiding building up of large inventories and have been ordering only for early needs, and consequently the industry does not think that the volume from that source will be affected much by the announcement that there will be no price advances. Miscellaneous demand is active. Considerable business is coming from stove manu-

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facturers, and orders from refrigerator manufacturers have increased.

Strip Steel

With the opening of books for the first quarter some new business has come from the motor car industry for January shipment. A number of parts makers are crowding mills for deliveries. Hot strip is in good demand from non-integrated cold rolling mills. Miscellaneous demand for cold-rolled strip has broadened and is quite active.

Iron Ore

Shipments of Lake Superior ore by water during 1935 were 28,362,368 tons. Shipments from upper Lake ports during the season are listed in another column.

Bolts, Nuts and Rivets

New prices on bolts and nuts for the first quarter have been announced. Large bolts and nuts are advanced about 10 per cent and small bolts 3 per cent. New prices are: Machine and carriage bolts, $\frac{1}{2}$ by 6 in. and smaller, 70, 10 and 5 per cent discount; larger, 70 and 10. Hot-pressed and cold-punched nuts, 70 and 10. Semi-finished nuts, 60, 20 and 15. Tire bolts, 55. Lag and plow bolts, 70 and 10. Small rivets are unchanged at 70 and 5 per cent off.

Scrap

The market is very firm, being strengthened by continued good mill operations. Quotations are unchanged. Consumers in this territory are sounding out the market on prices on steel-making grades and may make new purchases this week. Brokers are asking \$13 to \$13.25 for No. 1 heavy melting steel as compared with \$12.75 paid by local mills a few weeks ago. Dealers are paying \$13.25 and \$13.50 for No. 1 heavy melting steel and \$12.50 for No. 2 for delivery in the Youngstown district. Blast furnace scrap is quiet. Scrap offered by Michigan automobile companies in their December lists last week is reported to have brought good prices. The New York Central Railroad will take bids Dec. 4 on a miscellaneous list, the only sizable item in which is 825 tons of rails.

Speed Reducers.—Link-Belt Co., Philadelphia. Catalog No. 1519, 32 pages, describing and illustrating single, double and triple reduction herringbone gear reducers for large feed ratios and heavy and shock loads. All reducers listed in this book are rated on the basis of a recently recommended practice of the American Gear Manufacturers Association.



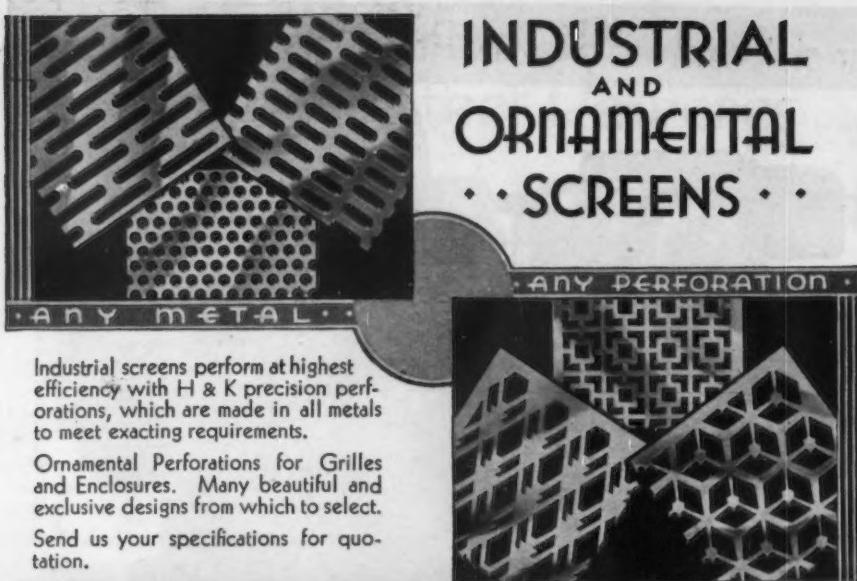
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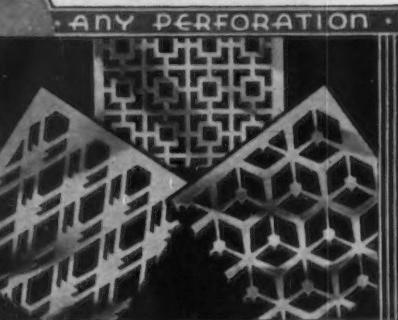
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Canadian Mills Are Heavily Booked as Tariff is Lowered

TORONTO, ONT., Dec. 3.—The new trade agreement between Canada and the United States, while criticized in some quarters, so far has had no detrimental effect on business in this country. Imports of iron and steel products are running well above those for 1934, according to figures released by the Dominion Bureau of Statistics, Ottawa. Imports of iron products in October were valued at \$10,556,000, an increase of \$3,786,000 over those for October, 1934. Of this total automobile parts were valued at \$2,309,000, against \$579,000 a year ago, and complete cars at \$140,000, compared with \$105,000. Other imports included machinery, \$1,818,000, up from \$1,801,000; castings and forgings, \$201,000, up from \$173,000; engines and boilers, \$675,000, up from \$341,000; iron plates and sheets, \$2,020,000, against \$1,125,000 in October last year.

Steel mills are maintaining high production rates. The Dominion Steel & Coal Corp., Sydney, N. S., is operating at about 60 per cent, with its rail mill reported on full time turning out the 40,000-ton order for the Canadian National Railways. In addition, the company has received substantial rail orders from South Africa, as well

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company state that business now is at the highest level since 1930 and it is expected that 1936 will be the peak year for all time for the company.

Railroad Equipment

Illinois Central will use its recent PWA loan of \$3,000,000 to improve equipment. Work will include general repairs to 141 locomotives and tenders, overhauling and repairs to 56 passenger cars, installation of air-conditioning equipment in 52 passenger cars, and repairs to 1297 steel underframe box cars.

Union Pacific is rebuilding 2447 box cars and 751 automobile cars.

Ferrocarril Nacional de Chiriquí, with offices at David City, Chiriquí, Panama, has placed order with American Locomotive Co. for one 2-8-0 type locomotive.

RAILS AND TRACK SUPPLIES

Chicago Great Western has placed joint order with Carnegie-Illinois Steel Corp. and Inland Steel Co. for 7100 tons of rails and necessary track accessories.

Union Pacific has contracted for 70,000 tons of rails and 30,000 tons of track accessories. The rail order was split as follows: 29,750 tons to Colorado Fuel & Iron Co.; 29,750 tons to Carnegie-Illinois Steel Corp., and 10,500 tons to Inland Steel Co.

Southern Pacific Co. opened bids Dec. 2 on 31,539 tons of 112-lb. rails and 9230 tons of 131-lb. rails.

Delaware, Lackawanna & Western has ordered 9000 tons of rails from Bethlehem Steel Co. and 1000 tons from Carnegie-Illinois Steel Corp. It has also bought 1500 tons of the plates, 800 tons of angle bars, 600 tons of track spikes and 400 tons of track bolts.

Wabash will open bids Dec. 10 on 1671 tons of 112-lb. and 119 tons of 90-lb. rails, 2790 pairs of rail joints, 65,000 tie plates, and necessary spikes and bolts for its bridge over Missouri River at St. Charles, Mo.

Norfolk & Western is in the market for 2000 kegs of spikes.

New Extras On Skelp

FOLLOWING the recent advance of \$2 a ton in the base price of skelp, producers have announced

new width and gage extras—the first extras ever applied to skelp. The base price is now limited to the larger sizes. The extras, which are effective immediately, are shown in the table.

Width in Inches		SIZE EXTRAS—SKELP Extras in Cents per Pound								
Over	Inc.	0.374 to 0.250	0.249 to 0.146	0.145 to 0.132	0.131 to 0.118	0.117 to 0.105	0.104 to 0.090	0.089 to 0.076	0.075 to 0.068	0.067 to 0.061
1	to	1 1/2	....	....	....	0.175	0.20	0.225	0.225	0.325
2	to	2 1/2	....	0.125	0.15	0.15	0.175	0.20	0.20	....
2 1/2	to	3	0.075	0.10	0.125	0.125	0.15	0.175	....	....
3	to	3 1/2	0.075	0.075	0.10	0.10	0.125	0.15	....	....
3 1/2	to	4	0.075	0.075	0.10	0.10	0.125	0.15	....	....
4	to	5	0.05	0.05	0.075	0.075	0.10	....	....	....
5	to	6	0.05	0.05	0.075	0.075	....	....	....	....
6	to	8	Base	0.025	0.05	0.05	....	....	....	....
8	to	10	Base	0.025	....	....	....	....	....	....
10	to	12	Base	0.025	....	....	....	....	....	....
12	to	15	Base	Base	....	....	....	....	....	....
15	to	20	Base	Base	....	....	....	....	....	....

NOTE: Widths and thicknesses other than those listed above are sold as plates, bars, sheets or strip, depending upon classification, at base prices and extras properly applicable thereto.

Prices of Finished Steel and Iron Products

BARS, PLATES, SHAPES

Iron and Steel Bars

	Soft Steel	Base per Lb.
F.o.b. Pittsburgh	1.85c.	
F.o.b. Chicago	1.90c.	
F.o.b. Gary	1.90c.	
F.o.b. Duluth	2.00c.	
Del'd Detroit	2.00c.	
F.o.b. Cleveland	1.90c.	
F.o.b. Buffalo	1.95c.	
Del'd Philadelphia	2.10c.	
Del'd New York	2.20c.	
F.o.b. Birmingham	2.00c.	
F.o.b. cars dock Gulf ports	2.25c.	
F.o.b. cars dock Pacific ports	2.40c.	

Rail Steel

(For merchant trade)	Base per Lb.
F.o.b. Pittsburgh	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Gary	1.75c.
F.o.b. Moline, Ill.	1.75c.
F.o.b. Cleveland	1.75c.
F.o.b. Buffalo	1.80c.
Del'd Birmingham	1.85c.
F.o.b. cars dock Gulf ports	2.10c.
F.o.b. cars dock Pacific ports	2.25c.

Billet Steel Reinforcing

(Straight lengths as quoted by distributors)	Base per Lb.
F.o.b. Pittsburgh	2.05c.
F.o.b. Chicago	2.10c.
F.o.b. Gary	2.10c.
Del'd Detroit	2.20c.
F.o.b. Cleveland	2.10c.
F.o.b. Youngstown	2.10c.
F.o.b. Buffalo	2.10c.
F.o.b. Birmingham	2.10c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.45c.

Iron

	Base per Lb.
F.o.b. Chicago	1.80c.
F.o.b. Terre Haute, Ind.	1.75c.
F.o.b. Louisville, Ky.	2.10c.
F.o.b. Danville, Pa.	1.80c.
F.o.b. Berwick, Pa.	1.70c.

* In quantities of 10,000 to 19,000 lb.

Fence and Sign Posts

	Angle Line Posts	Base per Net Ton
F.o.b. Pittsburgh		\$54.00
F.o.b. Chicago		54.00
F.o.b. Duluth		55.00
F.o.b. Cleveland		54.00
F.o.b. Birmingham		57.00
F.o.b. Houston, Orange, Beaumont, Galveston		63.00
F.o.b. Mobile		62.00
F.o.b. New Orleans, Lake Charles, Corpus Christi		62.00
F.o.b. cars dock Pacific ports		67.00

Plates

	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Gary	1.85c.
Del'd Cleveland	1.90c.
F.o.b. Coatesville	1.90c.
F.o.b. Sparrows Point	1.90c.
Del'd Philadelphia	1.90c.
Del'd New York	2.00c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.
Wrought iron plates, f.o.b. P'gh	2.20c.

Floor Plates

	Base per Lb.
F.o.b. Pittsburgh	3.35c.
F.o.b. Chicago	3.40c.
F.o.b. Coatesville	3.45c.
F.o.b. cars dock Gulf ports	3.75c.
F.o.b. cars dock Pacific ports	3.90c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago	1.85c.
F.o.b. Cleveland	1.90c.
F.o.b. Buffalo	1.95c.
F.o.b. Bethlehem	1.90c.
Del'd Philadelphia	1.90c.
Del'd New York	2.05c.
F.o.b. Birmingham (standard)	2.05c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.15c.
F.o.b. Chicago	2.25c.
F.o.b. Gary	2.25c.
F.o.b. Duluth	2.30c.
Del'd Detroit	2.00c.
F.o.b. Cleveland	1.90c.
F.o.b. Buffalo	1.95c.
Del'd Philadelphia	2.10c.
Del'd New York	2.20c.
F.o.b. Birmingham	2.00c.
F.o.b. cars dock Gulf ports	2.25c.
F.o.b. cars dock Pacific ports	2.40c.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

	Base per Lb.
No. 10, f.o.b. Pittsburgh	1.85c.
No. 10, f.o.b. Gary	1.95c.
No. 10, del'd Detroit	2.05c.
No. 10, f.o.b. Birmingham	2.00c.
No. 10, f.o.b. cars dock Pacific ports	2.40c.

Hot-Rolled Annealed

	Base per Lb.
No. 24, f.o.b. Pittsburgh	2.40c.
No. 24, f.o.b. Gary	2.50c.
No. 24, del'd Detroit	2.60c.
No. 24, f.o.b. Phila.	2.71c.
No. 24, f.o.b. Birmingham	2.85c.
No. 24, f.o.b. cars dock Pacific ports	3.05c.

Hot-Rolled Cold-Rolled

	Base per Lb.
No. 10 gage, f.o.b. Pittsburgh	2.50c.
No. 10 gage, f.o.b. Gary	2.60c.
No. 10 gage, del'd Detroit	2.70c.
No. 10 gage, f.o.b. Phila.	2.81c.
No. 10 gage, f.o.b. Birmingham	2.85c.
No. 10 gage, f.o.b. cars dock Pacific ports	3.10c.

Light Cold-Rolled

	Base per Lb.
No. 20 gage, f.o.b. Pittsburgh	2.95c.
No. 20 gage, f.o.b. Gary	3.05c.
No. 20 gage, del'd Detroit	3.15c.
No. 20 gage, f.o.b. Phila.	3.26c.
No. 20 gage, f.o.b. Birmingham	3.10c.
No. 20 gage, f.o.b. cars dock Pacific ports	3.50c.

Galvanized Sheets

	Base per Lb.
No. 24 gage, f.o.b. Pittsburgh	3.10c.
No. 24 gage, f.o.b. Gary	3.20c.
No. 24 gage, del'd Phila.	3.41c.
No. 24 gage, f.o.b. Birmingham	3.25c.
No. 24 gage, f.o.b. cars dock Pacific ports	3.70c.

Long Terne

	Base per Lb.
No. 24, unassorted 8-lb. coating	3.40c.
f.o.b. Pittsburgh	
F.o.b. Gary	3.50c.
F.o.b. cars dock Pacific ports	4.10c.

Vitreous Enameling Stock

	Base per Lb.
No. 20, f.o.b. Pittsburgh	3.10c.
No. 20, f.o.b. Gary	3.20c.
No. 20, f.o.b. Birmingham	3.70c.
No. 20, f.o.b. cars dock Pacific ports	3.70c.
No. 10, f.o.b. Pittsburgh	2.50c.
No. 10, f.o.b. Gary	2.60c.
No. 10, f.o.b. Birmingham	3.10c.
No. 10, f.o.b. cars dock Pacific ports	3.10c.

Tin Plate

	Per Box Box
Standard cokes, f.o.b. P'gh district mill	\$5.25
Standard cokes, f.o.b. Gary	5.35
Standard cokes, f.o.b. cars dock Pacific ports	5.90

Terne Plate

	Per Package, 20 x 28 in.
8-lb. coating I.C.	\$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips, and Flats under 1/4 in.

	Base per Lb.
All widths up to 24 in., P'gh	1.85c.
All widths up to 24 in., Chicago	1.95c.
All widths up to 24 in., del'd Detroit	2.05c.
All widths up to 24 in., Birmingham	2.00c.
Cooperage stock, Pittsburgh	1.95c.
Cooperage stock, Chicago	2.05c.

Cold-Rolled Strips

	Base per Lb.
F.o.b. Pittsburgh	2.60c.
F.o.b. Cleveland	2.60c.
Del'd Chicago	2.80c.
F.o.b. Worcester	2.80c.

Fender Stock

	Base per Lb.

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BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine bolts	75
Carriage bolts	75
Lag bolts	75
Flow bolts, Nos. 1, 2, 3 and 7 heads	75
Hot-pressed nuts, blank or tapped, square	75
Hot-pressed nuts, blank or tapped, hexagon	75
C.P.C. and t. square or hex. nuts, blank or tapped	75
Semi-finished hexagon nuts, U.S.S. and S.A.E., all sizes to and incl.	75
1 in. diameter	75
Larger than 1 in. diameter	75
Stove bolts in packages, Pittsburgh	72 1/2 and 10
Stove bolts in packages, Chicago	72 1/2 and 10
Stove bolts in packages, Cleveland	72 1/2 and 10
Stove bolts in bulk, Pittsburgh	82 1/2
Stove bolts in bulk, Chicago	82 1/2
Stove bolts in bulk, Cleveland	82 1/2
Tire bolts	90
Large Rivets	
(1/2-in. and larger)	
<i>Base per 100 Lbs.</i>	
F.o.b. Pittsburgh or Cleveland	\$2.90
F.o.b. Chicago	3.00
F.o.b. Birmingham	3.05
Small Rivets	
(7/16-in. and smaller)	
<i>Per Cent Off List</i>	
F.o.b. Pittsburgh	70 and 5
F.o.b. Cleveland	70 and 5
F.o.b. Chicago and Birmingham	70 and 5
Cap and Set Screws	
(Freight allowed up to but not exceeding 65¢ per 100 lbs. on lots of 200 lbs. or more)	
<i>Per Cent Off List</i>	
Milled cap screws, 1 in. dia. and smaller	80, 10 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75
Milled headless set screws, cut thread 3/8 in. and smaller	75
Upset hex. head cap screws, U.S.S. or S.A.E. thread, 1 in. and smaller	85
Upset set screws, cut and oval points	75 and 10
Milled studs	65 to 65 and 10

Alloy and Stainless Steel

Alloy Steel Ingots

(F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem)

Uncropped \$40 per gross ton

Alloy Steel Blooms, Billets and Slabs

(F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.)

Base price, \$49 a gross ton.

Alloy Steel Bars

Price del'd Detroit is \$52.

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base 2.45c.

Delivered price at Detroit is 2.60c.

S.A.E. Alloy Steel

Differential Numbers per 100 lbs.

2000 (1/4% Nickel) 20.25

2100 (2 1/2% Nickel) 20.55

2300 (3 1/2% Nickel) 1.50

2500 (5% Nickel) 2.25

3100 Nickel Chromium 0.55

3200 Nickel Chromium 1.35

3300 Nickel Chromium 2.80

3400 Nickel Chromium 3.20

4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum) 0.50

4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum) 0.70

4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum (1.50 to 2.00 Nickel) 1.05

5100 Chromium Steel (0.60 to 0.90 Chromium) 0.35

5100 Chromium Steel (0.80 to 1.10 Chromium) 0.45

5100 Chromium Spring Steel base

6100 Chromium Vanadium Bar 1.10c.

6100 Chromium Vanadium Spring Steel 0.70

Chromium Nickel Vanadium 1.50

Carbon Vanadium 0.95

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars 3/8c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2 1/4 in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo. 2.95c. base per lb.

STAINLESS STEEL No. 302

(17 to 19% Cr. 7 to 9% Ni. 0.08 to 0.20% C.)

(Base Prices f.o.b. Pittsburgh)

Forging billets	19.55c.
Rolling slabs	15c.
Bars	23c.
Plates	26c.
Structural shapes	23c.
Sheets	33c.
Hot-rolled strip	20 1/4c.
Cold-rolled strip	27c.
Drawn wire	23c.

Raw and Semi-Finished Steel

CANADA

Pig Iron

Per gross ton:

Carbon Steel Rerolling Ingots	Sheet Bars
F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Uncropped \$39 per gross ton	F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.
	Per Gross Ton
	Open-hearth or Bessemer..... \$30.90

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved	1.80c.
Universal	1.80c.
Sheared	1.80c.

Wire Rods

(Common, base)

Per Gross Ton	Per Gross Ton
F.o.b. Pittsburgh	\$40.00

Delivered Detroit

Per Gross Ton	Per Gross Ton
Bessemere	\$21.50

Per Gross Ton	Per Gross Ton
Bessemere	\$21.50

Per Gross Ton	Per Gross Ton
Bessemere	\$21.50

Per Gross Ton	Per Gross Ton
Bessemere	\$21.50

Per Gross Ton	Per Gross Ton
Bessemere	\$21.50

Per Gross Ton	Per Gross Ton
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Per Gross Ton	Per Gross Ton
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Per Gross Ton	Per Gross Ton
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Per Gross Ton	Per Gross Ton
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Per Gross Ton	Per Gross Ton
Bessemere	\$21.50

Per Gross Ton	Per Gross Ton

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Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel.	\$13.50 to \$14.00
No. 2 heavy melting steel.	12.50 to 13.00
No. 2 railroad wrought.	14.25 to 14.75
Scrap rails, 3 ft. and under.	14.25 to 14.75
Rails, 3 ft. and over.	15.50 to 16.00
Compressed sheet steel.	13.50 to 14.00
Hand bundled sheet steel.	12.25 to 12.75
Hvy. steel axle turnings.	11.50 to 12.00
Mach. shop turnings.	9.25 to 9.75
Short shov. turnings.	9.25 to 9.75
Short mixed borings and turnings.	8.00 to 9.00
Cast iron borings.	8.00 to 9.00
Cast iron carwheels.	14.00 to 14.50
Heavy breakable cast.	12.50 to 13.00
No. 1 cast.	14.00 to 14.50
Rail. knuckles and couplers.	15.50 to 16.00
Rail. coil and leaf springs.	15.50 to 16.00
Rolled steel wheels.	15.50 to 16.00
Low. phos. billet crops.	16.50 to 17.00
Low. phos. sheet bar crops.	15.75 to 16.25
Low. phos. punchings.	15.50 to 16.00
Low. phos. plate scrap.	15.00 to 15.50
Steel car axles.	14.50 to 15.00

CLEVELAND

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel.	\$12.25 to \$12.75
No. 2 heavy melting steel.	10.50 to 11.00
No. 2 railroad wrought.	14.25 to 14.75
Scrap rails.	14.25 to 14.75
Rails, 3 ft. and under.	15.50 to 16.00
Compressed sheet steel.	11.50 to 12.00
Light bundled sheet stampings.	9.25 to 9.75
Drop forge flashings.	10.25 to 10.75
Machine shop turnings.	7.00 to 7.50
Short shoveling turnings.	7.75 to 8.25
No. 1 busheling.	10.50 to 11.00
Steel axle turnings.	10.25 to 10.75
Low. phos. billet crops.	15.00 to 15.50
Cast iron borings.	7.25 to 7.75
Mixed borings and short turnings.	7.25 to 7.75
No. 2 busheling.	7.25 to 7.75
No. 1 cast.	12.50 to 14.00
Railroad grade bars.	7.00 to 7.50
Stove plate.	7.50 to 8.00
Rails under 3 ft.	15.50 to 16.00
Rails for rolling.	15.50 to 16.00
Railroad malleable.	15.50 to 16.00
Cast iron carwheels.	10.75 to 11.00

CHICAGO

Delivered Chicago district consumers:	
Per Gross Ton	
Heavy melting steel.	\$12.25 to \$12.75
Automobile h.v. melt. steel.	11.75 to 12.25
Sheathing steel.	13.25 to 13.75
Hydraulic comp. sheets.	12.50 to 13.00
Drop forge flashings.	10.75 to 11.25
No. 1 busheling.	11.75 to 12.25
Rolled carwheels.	14.00 to 14.50
Railroad tires.	14.00 to 14.50
Railroad leaf springs.	14.00 to 14.50
Axle turnings.	12.50 to 13.00
Steel couplers and knuckles.	14.25 to 14.75
Coil springs.	15.25 to 15.75
Axle turnings (elec. fur.).	13.25 to 13.75
Low. phos. punchings.	14.50 to 15.00
Low. phos. plates, 12 in. and under.	14.75 to 15.25
Cast iron borings.	6.50 to 7.00
Short shoveling turnings.	8.00 to 8.50
Machine shop turnings.	7.00 to 7.50
Rerolling rails.	14.00 to 14.50
Steel rails, less than 3 ft.	14.50 to 15.00
Steel rails, less than 2 ft.	15.50 to 16.00
Angle bars, steel.	14.00 to 14.50
Cast iron carwheels.	13.25 to 13.75
Railroad malleable.	15.75 to 16.25
Agricultural malleable.	11.00 to 11.50

Per Net Ton

Per Net Ton	
Iron car axles.	\$16.00 to \$16.50
Steel car axles.	14.00 to 14.50
No. 1 railroad wrought.	11.00 to 11.50
No. 2 railroad wrought.	11.75 to 12.25
No. 2 busheling, new.	10.00 to 10.50
No. 2 busheling, old.	7.00 to 7.50
Locomotive tires, smooth.	12.00 to 12.50
Pipes and fittings.	7.00 to 7.50
No. 1 machinery cast.	11.75 to 12.25
Clean automobile cast.	11.00 to 11.50
No. 1 railroad cast.	10.50 to 11.00
No. 1 agricultural cast.	10.25 to 10.75
Stove plate.	7.00 to 7.50
Grate bars.	8.50 to 9.00
Brake shoes.	8.50 to 9.00

PHILADELPHIA

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel.	\$12.00 to \$12.50
No. 2 heavy melting steel.	11.00 to 11.50
Hydraulic compressed, new.	11.50 to 12.00
Hydraulic compressed, old.	8.50 to 9.00
Steel rails for rolling.	14.00 to 14.50
Cast iron carwheels.	12.50 to 13.00
Heavy breakable cast.	12.00
No. 1 cast.	12.50 to 13.00
Stove plate (steel works).	9.00 to 9.50
Railroad malleable.	14.50 to 15.00
Machine shop turnings.	7.50 to 8.00
No. 1 blast furnace.	6.00
Cast borings.	6.00
Heavy axle turnings.	9.50 to 10.00
No. 1 low phos. heavy.	15.00 to 16.00
Couplers and knuckles.	15.00 to 15.50
Rolled steel wheels.	15.00 to 15.50
Steel axles.	16.00 to 16.50
Shafting.	18.00 to 18.50
No. 1 railroad wrought.	12.00 to 12.50
Spec. iron and steel pipe.	9.75 to 10.25
Bundled sheets.	10.50 to 11.00
No. 1 forge fire.	10.50 to 11.00
Cast borings (chem.).	10.50 to 12.00

CINCINNATI

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel.	\$10.00 to \$10.50
No. 2 heavy melting steel.	8.00 to 8.50
Scrap rails for melting.	9.25 to 9.75
Loose sheet clippings.	6.00 to 6.50
Bundled sheets.	7.25 to 7.75
Cast iron borings.	5.50 to 6.00
Machine shop turnings.	5.75 to 6.25
No. 1 busheling.	7.25 to 7.75
No. 2 busheling.	3.75 to 4.25
Railroad rolling.	10.25 to 10.75
No. 1 locomotive tires.	8.50 to 9.00
Short rails.	13.00 to 13.50
Cast iron carwheels.	9.50 to 10.00
No. 1 machinery cast.	10.50 to 11.00
No. 1 railroad cast.	9.75 to 10.25
Burnt cast.	7.25 to 7.75
Stove plate.	7.25 to 7.75
Agricultural malleable.	9.25 to 9.75
Railroad malleable.	10.50 to 11.00

ST. LOUIS

Dealers' buying prices per gross ton delivered consumers' works:	
Selected heavy steel.	\$10.50 to \$11.00
No. 1 heavy melting.	10.50 to 11.00
No. 2 heavy melting.	9.00 to 9.50
No. 1 locomotive tires.	9.75 to 10.25
Misc. stand.-sec. rails.	11.50 to 12.00
Railroad springs.	12.00 to 12.50
Bundled sheets.	6.50 to 7.00
No. 2 railroad wrought.	10.50 to 11.00
No. 1 busheling.	5.00 to 5.50
Cast iron borings and shoveling turnings.	3.00 to 3.50
Rails for rolling.	12.50 to 13.00
Mach. shop turnings.	3.75 to 3.25
Heavy turnings.	8.00 to 8.50
Steel car axles.	12.50 to 13.00
Iron car axles.	13.00 to 14.00
No. 1 railroad wrought.	7.00 to 7.50
Steel rails less than 3 ft.	13.00 to 13.50
Cast iron carwheels.	12.00 to 12.50
No. 1 machinery cast.	9.00 to 9.50
Railroad malleable.	12.50 to 13.00
No. 1 railroad cast.	9.50 to 10.00
Stove plate.	6.50 to 7.00
Agricult. malleable.	11.75 to 12.25

CANADA

Dealers' buying prices per gross ton:	
Toronto Montreal	
Heavy melting steel.	\$28.00
Rails, scrap.	8.50
Machine shop turnings.	3.50
Steel car axles.	5.00
No. 1 railroad wrought.	7.50
Steel axles.	4.50
Cast borings.	3.00
Wrought pipe.	4.00
Steel axles.	8.00
Axes, wrought iron.	8.50
No. 1 machinery cast.	9.50
Stove plate.	6.50
Standard carwheels.	7.75
Malleable.	7.50

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:	
No. 1 heavy melting steel.	\$11.50 to \$12.00
No. 2 heavy melting scrap.	10.50 to 11.00
Scrap rails.	12.00 to 12.50
New hydraulic comp. sheets.	10.00 to 10.50
Old hydraulic comp. sheets.	9.00 to 9.50
Drop forge flashings.	10.00 to 10.50
Hvy. steel axle turnings.	10.50 to 11.00
Mach. shop turnings.	5.50 to 6.00
Knuckles and couplers.	12.00 to 14.00
Rolled steel wheels.	13.00 to 14.00
Rolling mill.	13.00 to 14.00
Low. phos. billet crops.	14.50 to 15.00
Low. phos. sheet bar crops.	15.50 to 16.00
Low. phos. punchings.	15.50 to 16.00
Low. phos. plate scrap.	15.00 to 15.50
Steel car axles.	14.50 to 15.00

BUFFALO

Dealers' buying prices per gross ton:	
Heavy melting steel.	\$9.25 to \$9.75

ORES, FLUORSPAR, COKE, FUEL, REFRactories

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton	
Old range, Bessemer.	51.50% iron.
Old range, non-Bessemer.	51.50% iron.
Mesabi, Bessemer.	51.50% iron.
Mesabi, non-Bessemer.	51.50% iron.
High phosphorus.	51.50% iron.

Per Net Ton

Per Net Ton	
Iron, low phos., copper free.	55%
Iron, 58% iron, dry Spanish or Algeria.	55%
Iron, low phos., Swedish, average.	58%
Iron, basic or foundry, Swedish, aver. 65% iron.	58%
Iron, basic or foundry, Russian, aver. 65% iron.	58%
Manganese, Caucasian, washed 52%.	26%
Manganese, African, Indian, 48%.	22%
Manganese, African, Indian, 51%.	24%
Manganese, Brazilian, 46 to 48%.	26%

Foreign Ore

Per Unit	
Tungsten, Chinese, wolframite, duty paid.	\$15.50 to \$16.00
Tungsten, domestic, scheelite, delivered.	15.00

Per Gross Ton

Per Gross Ton	

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Warehouse Prices for Steel Products

PITTSBURGH

	Base per Lb.
Plates	3.15c.
Structural shapes	3.15c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.90c.
Cold-finished and screw stock:	
Rounds and hexagons	3.20c.
Squares and flats	3.20c.
Hoops and bands under $\frac{1}{4}$ in.	3.20c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.30c.
Galv. sheets (No. 24), 25 or more bundles	3.95c.
Hot-rolled sheets (No. 16)	2.95c.
Galv. corrug. sheets (No. 24), per square (more than 3750 lb.)	\$3.88
Spikes, large	2.90c.
Track bolts, all sizes, per 100 count, 65 per cent off list.	55c.
Machine bolts, 100 count, 65 per cent off list.	55c.
Carriage bolts, 100 count, 65 per cent off list.	55c.
Nuts, all styles, 100 count, 65 per cent off list.	55c.
Large rivets, base per 100 lb.	\$3.50
Wire, black, soft ann'd, base per 100 lb.	\$2.70
Wire, galv. soft, base per 100 lb.	\$2.925
Common wire nails, per kg.	\$2.834
Cement coated nails, per kg.	\$2.834
On plates, structural bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 999 lbs.	
*Delivered in Pittsburgh switching district.	

CHICAGO

	Base per Lb.
Plates and structural shapes	3.20c.
Soft steel bars, rounds	3.00c.
Soft steel bars, squares and hexagons	3.15c.
Cold-finished bars:	
Rounds and hexagons	3.35c.
Flats and squares	3.35c.
Hot-rolled strips	3.30c.
Hot-rolled annealed sheets (No. 24)	3.30c.
Galv. sheets (No. 24)	3.55c.
Hot-rolled sheets (No. 16)	3.05c.
Spikes (kg lots)	3.50c.
Track bolts (kg lots)	4.65c.
Rivets, structural (kg lots)	3.65c.
Rivets, boiler (kg lots)	3.75c.
Per Cent Off List	
Machine bolts	70c.
Carriage bolts	70c.
Lag screws	70c.
Hot-pressed nuts, sq. tap or	
Hot-pressed nuts, sq. tap or blank	70c.
Hot-pressed nuts, hex. tap or	
Hot-pressed nuts, hex. tap or blank	70c.
Hex. head cap screws	87 1/2c.
Cut point set screws	80
Flat head bright wood screws	50 and 20
Spring cotters	55
Stove bolts in full packages	70
Rd. hd. tank rivets, 7/16 in. and smaller	57%
Wrought washers	\$4.50 off list
Black ann'd wire per 100 lb.	\$3.85
Common wire nails, base per kg.	2.95c.
Cement c't'd nails, base per kg.	2.95c.
These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.	
*Base prices subject to deduction on orders aggregating 4000 lb. or over.	
For 50 bundles or over.	
For less than 2000 lb.	

NEW YORK

	Base per Lb.
Plates, $\frac{1}{4}$ in. and heavier	3.40c.
Structural shapes	3.37c.
Soft steel bars, rounds	3.31c.
Iron bars	3.31c.
Iron bars, swed. charcoal, 6.75c. to 7.00c.	
Cold-fin. shafting and screw stock:	
Rounds and hexagons	3.81c.
Flats and squares	3.81c.
Cold-rolled; strip, soft and quarter hard	3.36c.
Hoops	3.56c.
Bands	3.56c.
Hot-rolled sheets (No. 10)	3.31c.
Hot-rolled ann'd sheets (No. 24*)	3.89c.
Galv. sheets (No. 24*)	special
Long term sheets (No. 24)	5.25c.
Standard tool steel	11.00c.
Wire, black annealed (No. 10)	3.40c.
Tire steel, 1 x $\frac{1}{4}$ in. and larger	3.75c.
Open hearth spring steel, 4.00c.	3.75c.
Common wire nails, base per kg.	\$3.21
Per Cent Off List	
Machine bolts, square head and nut:	
All diameters	70 and 10
Carriage bolts, cut thread:	
All diameters	65 and 10

WAREHOUSE PRICES FOR STEEL PRODUCTS

PITTSBURGH

	Per 100 Ft.
Lad. welded, 2-in.	\$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.91
Charcoal iron 4-in.	63.65
*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.	

ST. LOUIS

	Base per Lb.
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Plates and struc. shapes	3.45c.
Bars, soft steel (rounds and flats)	3.25c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.40c.
Cold-fin. rounds, shafting, screw stocks	3.60c.
Hot-rolled annealed sheets (No. 24)	4.10c.
Galv. sheets (No. 24)	4.65c.
Hot-rolled sheets (No. 10)	3.30c.
Black corrug. sheets (No. 24)	4.10c.
Structural rivets	4.00c.
Bolier rivets	1.10c.
Per Cent Off List	
Tank rivets, 7/16 in. and smaller	55c.
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts:	
All quantities	70c.
*No. 26 and lighter take special prices.	

PHILADELPHIA

	Base per Lb.
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*Plates, $\frac{1}{4}$ -in. and heavier	2.98c.
*Structural shapes	2.98c.
*Soft steel bars, small shapes, iron bars (except bands)	3.03c.
*Reinforce. steel bars, sq. twisted and deformed	2.96c.
Cold-finished steel bars	3.61c.
*Steel hoops	3.43c.
*Steel bands, No. 12 and 3/16 in. incl.	3.18c.
Spring steel	5.00c.
*Hot-rolled annealed sheets (No. 24)	3.85c.
*Galvanized sheets (No. 24)	4.40c.
*Hot-rolled annealed sheets (No. 10)	3.08c.
Diam. pat. floor plates, $\frac{1}{4}$ in.	4.95c.
Swedish iron bars	6.25c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

*For 50 bundles or over.

*For less than 2000 lb.

CLEVELAND

	Base per Lb.
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Plates and struc. shapes	3.31c.
Soft steel bars	3.00c.
Reinfor. steel bars	2.10c.
Cold-finished steel bars	3.25c.
Flat-rolled steel under $\frac{1}{4}$ in.	3.36c.
Cold-finished strip	\$2.00c.
Hot-rolled annealed sheets (No. 24)	3.96c.
Galvanized sheets (No. 24)	4.61c.
Hot-rolled sheets (No. 10)	3.11c.
Hot-rolled 3/16 in. to 48 in. wide sheets	3.56c.
Black ann'd wire, per 100 lb.	\$2.75c.
No. 9 galv. wire, per 100 lb.	3.10
Com. wire nails, base per kg.	2.70

*Outside delivery 10c. less.

*For 5000 lb. cr less.

CINCINNATI

	Base per Lb.
--	--------------

Plates and struc. shapes	3.42c.
Bars, rounds, flats and angles	3.22c.
Other shapes	3.27c.
Rail steel reinforc. bars	3.25c.
Cold-finished bars	3.47c.
Hot-rolled annealed sheets (No. 24)	4.02c.
Galv. sheets (No. 24)	4.72c.
Hot-rolled sheets (No. 10)	3.22c.
Structural rivets	4.35c.
Small rivets	55 per cent off list
No. 9 ann'd wire, per 100 lb. (100 lb. or over)	\$2.88
Com. wire nails, base per kg:	
Any quantity less than carload	3.04
Cement c't'd nails, base 100-lb. keg, 3.50	
Chain, lin. per 100 lb.	3.35
Net per 100 Ft.	
Seamless steel boiler tubes, 2-in.	\$20.37
4-in.	48.14
Lap-welded steel boiler tubes, 2-in.	19.38
4-in.	45.32

BUFFALO

	Base per Lb.
--	--------------

Plates	3.36c.
Struc. shaped	3.25c.
Soft steel bars	3.06c.
Reinforcing bars	2.66c.

Base per Lb.

Mild steel bars

 Base per Lb.

 Iron bars

 Base per Lb.

 Base

Philadelphia Sales Taper As Prices Hold Steady



Operations Rise One Point — Outlook for Fabricated Plates and Shapes Promising — Scrap Steady

PHILADELPHIA, Dec. 3.—With all sellers willing to accept first quarter bookings on most forms of finished steel at unchanged price levels, the bullish market sentiment of several weeks ago has disappeared. One favorable development for sellers has been the lack of cancellations or delays in delivery dates on business previously placed in anticipation of price advances. Evidently most consumers feel that their business justifies scheduled deliveries over the turn of the year. It should be noted, however, that the rank and file of small users made no effort to commit themselves prior to the price announcement. It was their attitude that, as usual, sufficient time would be given to cover their forward needs at old prices in the event of higher first quarter quotations. Day-to-day orders from this type of consumer constitute the major part of current business, which has lately shown a tendency to taper off in aggregate volume. Probably this tapering merely reflects a desire to keep inventories at a minimum as the year-end approaches.

The failure of sellers of flat-rolled products to take advantage of their opportunity to advance quotations has resulted in no end of surprised comment on the part of buyers. The most likely explanation is that stronger mills were of the opinion that competitors would be less likely to undersell at the present market level than they would be if a few dollars were added to prices. These same stronger mills prefer a more stable market at a lower average level than an unstable market at a semi-fictitious higher level.

All mills selling skelp have issued a scale of extras which became effective on Dec. 2. Heretofore, skelp has been sold on a weight basis without regard to gage or size. The new extras are approximately one-half those on strip, and vary from base for all gages in widths over 12 in. up to a maximum extra of 0.325c. a lb. for 0.067 to 0.061-in. material between 1 and 1½ in. wide. There

is only one large user of skelp in this area; consequently this price revision is of minor importance here.

Most mills in this area are operating at a rate practically unchanged from last week. Slightly heavier melting schedules are reported in several sections, however, and the district ingot rate is consequently up one point to 41 per cent of capacity. Average operation in this district a year ago was approximately 24 per cent.

Pig Iron

Little new business has matured. As in previous weeks, sellers are currently more concerned with urging customers to take deliveries on book orders than they are with trying to dig up what little new tonnage may be available. Most jobbing foundries are working at a fair rate, and the outlook is for

sustained melting activity over the next two months.

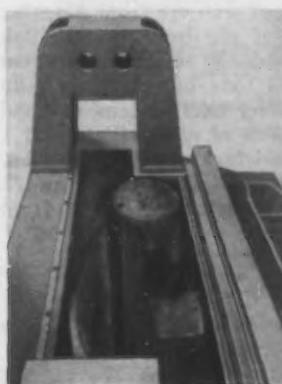
Sheets and Strip

Larger Pittsburgh companies are asking six weeks in which to deliver cold-rolled grades and about four weeks for hot-rolled grades. Smaller district mills, however, have much smaller backlog and are able to give immediate service on ordinary grades of flat-rolled products. The market for blue annealed sheets has eased off somewhat with the seasonal decline in fabrication of storage tanks. Galvanized sheets are moving in fair tonnages to jobbers, who in turn are experiencing a well-sustained miscellaneous demand. The Navy Department is accepting bids until Dec. 17 on 1000 tons of galvanized. Two radio makers are steadily taking in moderate quantities of strip, and the two local autobody stamping plants are in the market constantly for forward requirements. On the surface, prices appear to be very steady, although it is reported that some sellers are waiving certain extras when dealing with favored customers.

Bars, Plates and Shapes

After several years of comparative inactivity, these three products appear to have a more encouraging future. Under PWA auspices, about 74 schools are to be built in eastern Pennsylvania and, in addition, a sizable volume of highway work is up for bidding in Pennsylvania and New Jersey. Although

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some of the schools are small, they will require a total of about 1500 tons of reinforcing and around 5000 tons of shapes. New Jersey highway lettings this month will take 1800 tons additional reinforcing and Pennsylvania lettings will take about 400 tons. Highway bridges in these same two States, now up for bidding, will require over 1500 tons of shapes. The market for plates is equally as auspicious. Pusey & Jones Corp. at Wilmington, is bidding on three Navy boats taking a total of 1900 tons, steel will soon be purchased for the International Mercantile Marine liner, and it is reported that Sun Shipbuilding & Dry Dock Co. may secure an award on several additional oil tankers.

Scrap

Most district melters do not consider themselves in dire need of supplies and are consequently not pushing brokers for new tonnages. Nevertheless the market continues steady and strong despite this lack of support from mills. Perhaps this attitude is fostered to some extent by the reluctance of dealers to throw supplies on the market, in view of insistent war talk in the air and the constant interest of foreign users in this market. It would come as no surprise if Japan should soon enter the market for a sizable tonnage, inasmuch as the steel business there has picked up slightly after a period of inactivity. In addition, European countries are now more prone to follow up their inquiries with actual orders. A boat will be in on Dec. 18 to take a cargo out of Port Richmond, and

export buying for that point may reappear within the next few weeks. Brokers are paying \$12 freely to cover No. 1 orders at Coatesville and Phoenixville, cast grades are still very strong, and new orders on stove plate will probably be made on a \$10 basis. Budd's December list of 3500 tons of bundles was bid in last Friday at an estimated \$11.25 f.o.b. price, and the Pennsylvania Railroad is offering 23,400 tons of No. 1 steel and 10,000 tons of steel axles, the largest single list in many months. Most of this material customarily goes to the Pittsburgh area.

Imports

The following iron and steel imports were received here last week: 5700 tons of iron ore from Algeria; 401 tons of pig iron from British India; 50 tons of tungsten ore from China; 33 tons of steel tubes, 25 tons of steel bars, 5 tons of steel wire, 4 tons of steel billets and 1 ton of steel forgings from Sweden, and 17 tons of floor plates and 8 tons of structural shapes from Belgium.

**Detroit Scrap Mart
Gains Strength**

DETROIT, Dec. 3.—The local scrap market has gained a little strength the past week, with new factory busheling and low phosphorous plate scrap up 25c. a ton and other items firm, but unchanged. Dealers look for prices to stay close to current levels in the immediate future.

**Production Gains
Sharply at Buffalo**

BUFFALO, Dec. 3.—Addition of four open-hearts has lifted the operation figures in this district. Bethlehem's Lackawanna plant had been operating nine, but added one additional furnace Wednesday, Thursday and Friday of last week, making 12 now active. Republic Steel Corp. is up one to five, and Wickwire Spencer Steel Co. continues to operate one. The Seneca sheet division of Bethlehem is running at 90 per cent or better.

Heavy public works offerings are enlivening the market for fabricated structural. The WPA has approved grade crossing projects which will require over 5000 tons of steel. Included are two in Erie County to require 150 and 200 tons respectively; 100 tons in Genesee County; 150 tons in Onondaga County; 400 tons in Ulster County; 200 tons in Orange; 150 tons in St. Lawrence County; 400 tons in Chenango County; 870 tons in Rensselaer County. In addition to these jobs are a large number of small jobs of between 50 and 75 tons. A high school at Rochester, N. Y., will require 150 tons.

A Chicago firm is low bidder on 250 tons of plates for elevated tanks for the village of Perry, N. Y. The city of Niagara Falls will require 350 tons of 54-in. pipe for water works beds.

Local scrap dealers are participating in a new order of No. 2 heavy melting steel, calling for the delivery of 5000 tons at \$10.75. No. 1 heavy melting steel is included. Railroad malleable sold here brings \$16, Batavia. The largest consumer is resuming receipt of shipments Dec. 2 after a suspension.

**Output Holds in
Cincinnati Area**

CINCINNATI, Dec. 3.—Sales of pig iron the past week were slightly less than in the preceding week, totaling about 1200 tons. Current bookings of Southern iron are only about 150 tons a week. Melt has been reduced to about 35 per cent, but prospects continue to be good. Stove and jobbing foundries are feeling a slight recession in demand, but automotive and machine tool foundries report a steady flow of orders.

Opening of books for first quarter sheet steel business reflects a continued heavy demand. Current operations tax mill capacity, but no business is being refused. Or-

ders are for current needs, with users showing no disposition to anticipate requirements. Ingot production holds doggedly to about 85 per cent, with two plants running all open-hearths.

Movement of foundry coke is at unchanged volume. Users are accepting fuel at the contract rate, but are placing no new business. Further pressure on scrap prices is expected following continuance of current finished steel prices for next quarter. Orders are for small quantities for urgent needs, but forward contracting is nil. Dealers are adhering to current bid schedules and insisting on better selling prices.

Reinforcing Steel

Awards 3625 Tons—New Projects 13,415 Tons

AWARDS

Newburyport, Mass., 460 tons, two bridges, to Northern Steel Co.

Providence, R. I., 100 tons, Rhode Island School of Design, to an unnamed bidder.

New York, 725 tons, Seventy-ninth Street grade crossing separation; from Frederick Snare Corp., general contractor, to Kalman Steel Corp.

New York, 450 tons, State Procurement Division of Treasury, to Jones & Laughlin Steel Service.

New York, 125 tons, State Procurement Division of Treasury, to Igoe Brothers.

Milwaukee, 850 tons, housing project, to Concrete Steel Co.; previously reported to an unnamed bidder.

Chicago, 650 tons, dental building, to Inland Steel Co.

Peoria, Ill., 350 tons, lock, to Inland Steel Co.

San Francisco, 240 tons, storehouse at Fort Scott, to Soule Steel Co.

Los Angeles, 100 tons, University high school alterations, to an unnamed bidder.

Orange County, Cal., 194 tons, State grade separation, to an unnamed bidder.

Arcadia, Cal., 100 tons, addition to Los Angeles Turf Club, to an unnamed bidder.

Spokane, Wash., 130 tons, State overhead crossing, to Northwest Steel Rolling Mills.

NEW REINFORCING BAR PROJECTS

State of New Jersey, 1800 tons, various highway projects; bids due Dec. 4, 9 and 15.

State of Pennsylvania, 400 tons, various highway projects; bids Dec. 6.

Medford, Mass., 250 tons, Northern Metropolitan relief sewer.

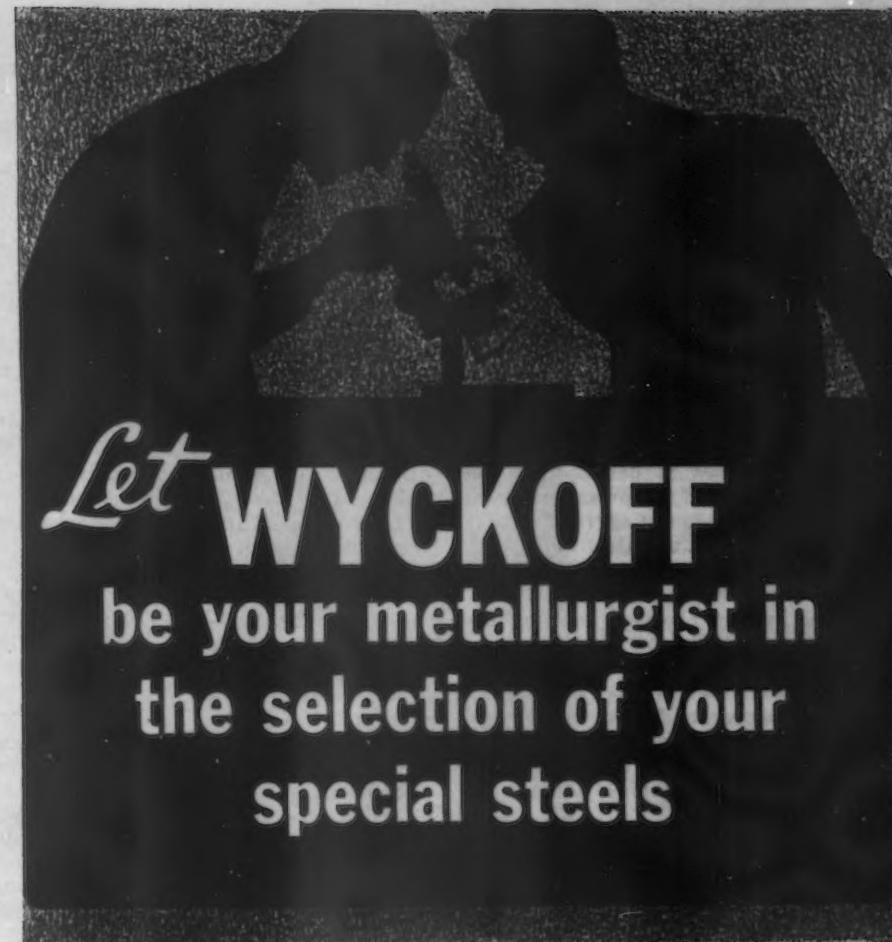
Westfield, Mass., 250 tons, State hospital units.

New York, 1000 tons, section of West Side elevated highway, Forty-sixth to Fifty-ninth Streets; revised bids to be taken by Borough of Manhattan, Dec. 18.

Columbus, Ohio, 110 tons, WPA work in Cuyahoga County.

Cleveland, 250 tons, school additions.

Cincinnati, 1400 tons, water purification plant; bids Dec. 13.



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Manufacturers of Cold Drawn Steels

Turned and Polished Shafting Turned and Ground Shafting

Wide flats up to 12" x 2" thick

Chicago, 6000 tons, Outer Drive, bids to be taken in sections.

Chicago, 1200 tons, Sanitary District; new bids to be taken.

Weldon Springs, Mo., 125 tons, substructure for highway bridge over Missouri River; low bidder on general contract.

Ogden, Utah, 500 tons, canals and structures on Ogden River project; bids Dec. 20.

Sausalito, Cal., 100 tons, yacht harbor; new bids Dec. 10.

San Francisco, 150 to 200 tons, Alemany Boulevard sewer; bids Dec. 6.

San Mateo, Cal., 800 tons, livestock building; bids opened Dec. 3.

Salinas, Cal., 105 tons, post office; bids opened.

Los Angeles, 715 tons, State overhead crossing at Figueroa Street; bids Dec. 19.

Los Angeles, 100 tons, State overhead crossing at Soto Street; bids Dec. 19.

Los Angeles, 335 tons, State undergraduate crossing at Mission Road; bids Dec. 19.

Bookings Hold Up Fairly Well at New York



Rail Buying and Construction Are Supporting Influences—Piling Prices Break on Florida Project

NEW YORK, Dec. 3.—The failure of expected price increases to develop has removed much of the pressure behind demand, but in the aggregate bookings have held up fairly well. Much of the covering in anticipation of advances was merely tentative and was held in abeyance pending actual announcement of new prices. Meanwhile both railroad buying and construction are looming as more important factors in the market, tin plate demand is continuing in good volume for the season, and miscellaneous business is showing further growth.

Fabricators and contractors are being pushed hard estimating on numerous Government-financed construction projects, on all of which bids must be filed on Dec. 15. The Forty-sixth to Fifty-ninth Street section of the West Side elevated highway, Manhattan, on which tenders were recently postponed pending a clarification of the Government's attitude toward the use

of foreign materials, will come up for new figures Dec. 18, with the Borough of Manhattan receiving bids. The steel involved includes 12,000 tons of structural shapes and 1000 tons of reinforcing bars. The contractor on the Triborough bridge, New York, who recently rescinded an order for German piling has completed purchases of American piling. In addition to 250 tons of second hand piling and 20 tons of new piling ordered from the Jones & Laughlin Steel Corp., 330 tons of new piling has been purchased from the Carnegie-Illinois Steel Corp. The latter company also has received an order for 450 tons of piling for another part of the Triborough project.

The Delaware, Lackawanna & Western has ordered 9000 tons of rails from the Bethlehem Steel Co. and 1000 tons from the Carnegie-Illinois Steel Corp. It has also distributed orders for 1500 tons of tie plates, 800 tons of angle bars, 600 tons of spikes and 400 tons of

track bolts. The New York Central may enter the market for 30,000 to 35,000 tons of rails about the middle of January. The same railroad contemplates increasing its freight car rebuilding program from 1500 to 2500 cars. The Norfolk & Western is in the market for 2000 kegs of spikes.

The United States Lines have postponed the taking of revised bids on their trans-Atlantic liner, requiring 16,000 tons of hull steel, to Dec. 7.

The Amtorg Corp. has bought an experimental tonnage of automobile sheets from an American mill for a new car which is intended to represent a quality about halfway between the Buick and the Packard. Some of these sheets will be tried out at the Philadelphia plant of the Edward Budd Mfg. Co., which has the contract for furnishing the dies.

About the only finished steel price advances that "stuck" were increases of \$4 a ton on track spikes and \$1 a ton on bolts. Concessions on concrete bars are still common, and the secondary pipe market remains unstable. The market on steel piling, evidently influenced by the pressure of foreign competition, has finally broken wide open in connection with bids on a large Florida project, the lowest of which represented a cut of more than \$8 a ton.

Pig Iron

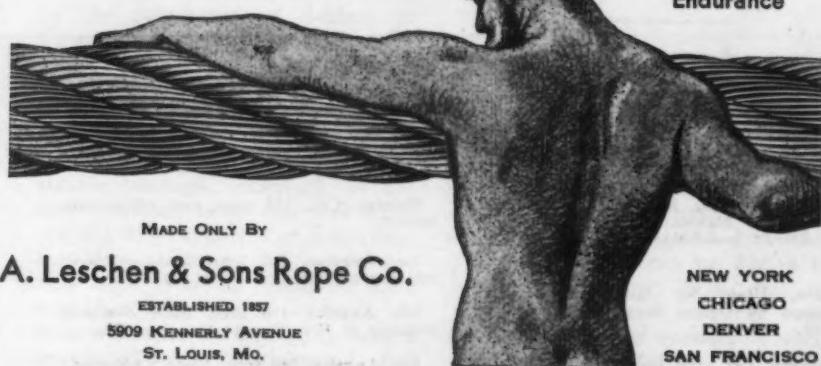
The opening of first quarter books on Dec. 1 failed to attract any buying. Earlier in the week, however, some carlot business was done, and total sales came to about 400 tons, compared with 775 tons in the week before. Sellers report that foundries are displaying a greater willingness than heretofore to meet payments as they fall due. Occasional reports have been heard that the new year might see another advance in iron prices, but this is now believed to be very unlikely. In all other respects the market remains quiet. The attention of producers is confined largely to liquidation of orders outstanding on company books.

Reinforcing Steel

While awards in this district were very light last week, the placing of several contracts by the State procurement division of the Treasury Department aroused considerable interest regarding prices. The market in this respect has weakened substantially. Revised bids to be taken by the Borough of Manhattan on the section of the West Side Elevated Highway between Forty-sixth and Fifty-ninth

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Streets will be taken Dec. 18. The project includes 1000 tons of bars. Among the procurement division lettings, Jones & Laughlin Steel Service Co. took 450 tons, while Igoe Brothers took 125 tons. The Frederick Snare Corp., which received the general contract for the Seventy-ninth Street grade elimination, has placed the 725 tons of bars with Kalman Steel Co.

Scrap

The market here has leveled off. Prices are quite stable at present levels and, unless the Government takes action against scrap reports, there should be no significant recession over the next few months. A number of foreign inquiries are still in the market. The prices offered are usually satisfactory to brokers, but terms are not attractive enough to result in much actual business. A little steel is being loaded on barges for Japan, one broker is loading No. 2 for probable Italian shipment, and No. 1, No. 2 and cast grades are being accumulated on barges for England. Cast grades are now the most active in the domestic market. Brokers are paying \$12 a ton locally for heavy breakable, delivered Harrisburg, and \$12 for No. 1, delivered Phoenixville. One eastern Pennsylvania melter is again holding up No. 1 deliveries. No. 2 is being loaded at New York and nearby New Jersey for delivery to Coatesville at \$11 a ton.

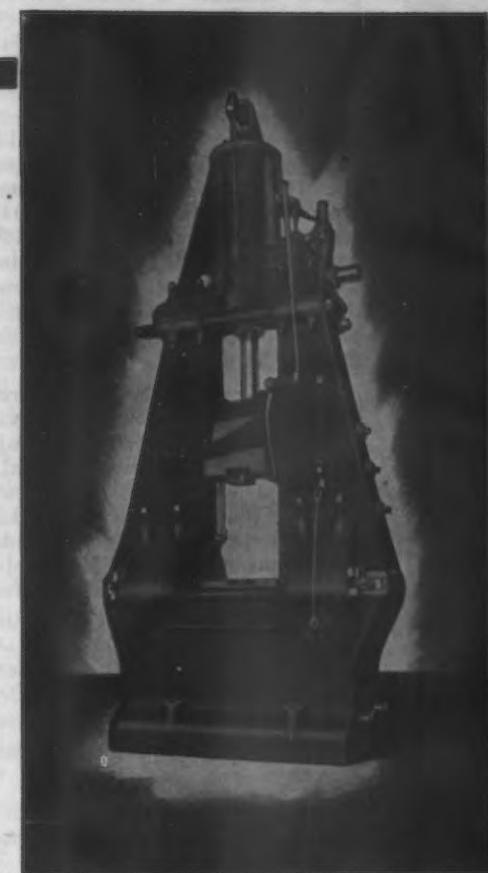
Scrap Firm at St. Louis

ST. LOUIS, Dec. 3.—While the announcement of mills that prices on rails, angle bars and tie plates will be continued through the first half of 1936 has not stimulated any business from the railroads, it has given them assurance to proceed with programs that have been virtually decided upon. Effective Jan. 1 the price of spikes has been advanced to 2.60c. The trade also has been informed that present prices on structural plates and shapes, bars, hot-rolled strips and sheets have been continued for the first quarter.

The Wabash Railway will open bids on Dec. 10 for 1671 tons of 112-lb. rails and 119 tons of 90-lb. rails and the necessary accessories for its bridge over the Missouri River at St. Charles, Mo.

The Kansas City Bridge Co. is the low bidder on the general contract for the Weldon Springs highway bridge over the Missouri River, requiring 4920 tons of structural steel for the superstructure

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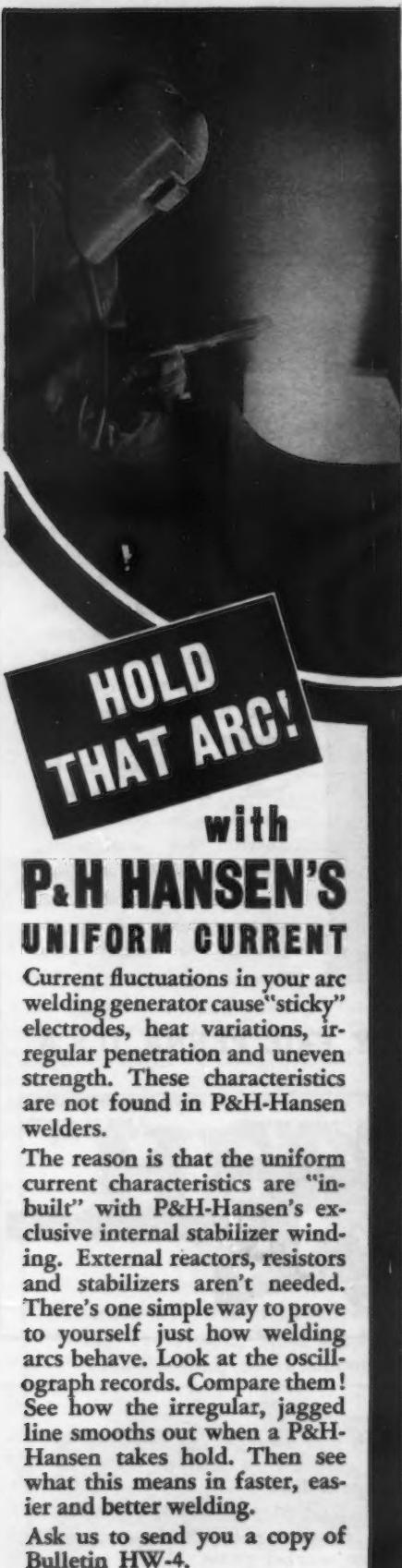


and 125 tons of reinforcing bars for the substructure. St. Louis Structural Steel Co. is the low bidder on the overhead crossing near French Village, Ill., requiring 603 tons of structural steel, and Selden-Breck Construction Co. is low bidder on the general contract for a service building for the local city hospital, requiring 200 tons of structural steel. A total of 700 tons of structural steel will be required for the strip mill to be built for the Granite City Steel Co., contract for

which was awarded, as reported in this column, to Stupp Brothers Bridge & Iron Co.

An East Side melter has bought 4000 tons of heavy melting steel at the market price. There were no offerings during the week, and prices are unchanged.

Shipments of pig iron are being well maintained, and are expected to be stepped up considerably for the remainder of this month. A seasonal slowing down of the stove industry is reported.



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**P&H HANSEN
ARC WELDERS**

90—THE IRON AGE, December 5, 1935

More Crossing Jobs Out on Coast

SAN FRANCISCO, Dec. 2.—State grade separation programs continue to swell the already extensive pending list. New advertised contracts involve 3641 tons of structural steel and 2983 tons of reinforcing bars. Four of these projects in Los Angeles, on which bids will be opened Dec. 19, will require 2019 tons of shapes and 1150 tons of bars. An aggregate of approximately 13,045 tons of structural steel and 8165 tons of reinforcing bars are included in highway grade separation contracts on which bids will be opened here on the Coast within the next 16 days.

Consolidated Steel Corp. is reported to have booked approximately 3400 tons of plates on projects at Los Angeles and Vista, Cal., and St. George, Utah. The Gene pumping plant and intake works, to be constructed on the Colorado River aqueduct for the Metropolitan Water District, accounted for 2000 tons. Soule Steel Co. will furnish 240 tons of bars for a storehouse at Fort Scott, near San Francisco. Steel Tank & Pipe Co. is reported as low bidder on 1800 tons of 36-in. welded pipe at San Francisco.

Various stipulations in the contract to be opened Dec. 5 by the United States Engineers in Los Angeles will make possible awards from 11,350 to 22,500 tons of reinforcing bars, although it is believed that 14,537 tons will be purchased for the flood control work.

Although plans are somewhat indefinite, it is understood that a 165-mile pipe line may be laid between Kettleman Hills and Stockton, Cal., Airlane Refining & Transportation Co., Ltd., being the owner. Present estimates for the third unit of the Green River pipe line, near Tacoma, Wash., call for only 525 tons of plates instead of the heavier tonnage previously reported.

Although track spikes have just advanced \$4 a ton and bolts \$1 a ton, no other revisions in the price schedule are immediately anticipated. Jobbing business shows healthy activity and mill production continues at a good pace.

The Bureau of Supplies and Accounts, Navy Department, will open bids, Dec. 17, on 1065 tons of black and galvanized sheets for delivery to various Navy yards.



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**P&H HANSEN
ARC WELDERS**

Buying of Copper Increases Slightly During Week—Tin Still Scarce

Sellers' Market in Lead Continues with Demand Unabated—Zinc Quiet and Firm

NEW YORK, Oct. 3.—Toward the middle of last week the market experienced a slight gain in demand for domestic copper, but subsequently interest died down, and today conditions were reported as generally very quiet but sound. Total sales in November reached 32,000 tons. While not heavy, they were better than expected in that demand toward the period's end tended to pick up a bit. Yesterday domestic sales of 2032 tons were about in line with current daily averages. Foreign activity is reported to have increased somewhat lately on renewed support from munitions interests. Today in London electrolytic ranged from about 8.75 to 8.80c. a lb. The

domestic quotation of 9.00c. a lb., Connecticut Valley, is understood to be very firm. United States deliveries of tin in November were 4035 tons, compared with 5355 tons in October.

Tin

Inquiry for spot and December positions led to a fair volume of purchasing last week, and, in addition, a few parcels were sold on February call. Nearby positions still are tight, however, as supplies in November did not increase by the expected amount. In all, the gain totaled only 900 tons for world visible supplies against expectations of at least from 2000 to 3000 tons. Eventually the situation will

be definitely remedied by anticipated arrivals from the East. Prices worked upward in the period just ended, and today spot Straits metal at New York is quoted at 52.00c. a lb. In London this morning standard quotations were at £224 10s. for spot and £213 5s. for futures. The Eastern price was £219 5s.

Zinc

Transactions in this commodity have entered upon a routine stage. Orders are slight, though from day to day regular carlot business is being done. Prices remain at the 4.85c. a lb. level, and, as far as can be determined, no prospects of a change are now in sight. Apparent consumption, as revealed by shipments, is heavy, a condition from which the market derives its current strong undertone. In the period just ended, new bookings came to about 2000 tons for delivery as far forward as March in some instances.

Lead

As has been the case in the past 8 or 10 weeks, lead sales continue to reflect the improved state of business among consuming industries. Producers report no abatement in demand for the period just ended, with practically all types of consumption represented. The opening of January books late last week uncovered satisfactory buying for that month, and until yesterday, daily sales were approximately two-thirds for January as against one-third for December. Battery and paint makers appear to be the most consistent takers in addition to being the heaviest. Refined lead production in October increased to 42,600 tons from 34,400 tons in September, but, as previously pointed out, this development is having little or no effect on the market generally. The 4.50c. a lb. price level at New York is firm. All indications are that the factors which have made of the present situation a sellers' market will continue in the immediate future.

Non-Ferrous Averages

The average prices for the major non-ferrous metals for November, based on daily quotations in THE IRON AGE, are as follows:

	Average
Electrolytic copper, N. Y.†	9.000c. a lb.
Lake copper, Eastern de-	
livery	9.275c. a lb.
Straits tin, spot, N. Y.	51.979c. a lb.
Zinc, East St. Louis	4.888c. a lb.
Zinc, New York	5.233c. a lb.
Lead, St. Louis	4.250c. a lb.
Lead, New York	4.500c. a lb.

†Price $\frac{1}{4}$ c. higher in Connecticut Valley.

The Week's Prices. Cents Per Pound for Early Delivery

	Nov. 27	Nov. 28	Nov. 29	Nov. 30	Dec. 2	Dec. 3
Electrolytic copper, N. Y.*	9.00	9.00	9.00	9.00	9.00	9.00
Lake copper, N. Y.	9.37 $\frac{1}{4}$	9.37 $\frac{1}{4}$	9.37 $\frac{1}{4}$	9.37 $\frac{1}{4}$	9.37 $\frac{1}{4}$	9.37 $\frac{1}{4}$
Straits tin, spot, New York†	51.25	...	51.25	...	51.50	52.00
Zinc, East St. Louis	4.85	4.85	4.85	4.85	4.85	4.85
Zinc, New York†	5.22 $\frac{1}{2}$	5.22 $\frac{1}{2}$	5.22 $\frac{1}{2}$	5.22 $\frac{1}{2}$	5.22 $\frac{1}{2}$	5.22 $\frac{1}{2}$
Lead, St. Louis	4.35	4.35	4.35	4.35	4.35	4.35
Lead, New York	4.50	4.50	4.50	4.50	4.50	4.50

*Refinery quotations; price $\frac{1}{4}$ c. higher delivered in Connecticut.

†Includes emergency freight charge.

Aluminum, virgin 99 per cent plus, 19.00c.-22.00c. a lb., delivered. Aluminum, No. 12 remelt, No. 2 standard, in carloads, 17.00c. a lb., delivered. Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more. Antimony, Asiatic, 14.75c. a lb., New York. Quicksilver, \$74.00 to \$75.00 per flask.

Brass ingots, commercial 85-5-5-5, 9.25c. a lb., delivered; in Middle West $\frac{1}{4}$ c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	53.00c. to 54.00c.
Tin, bar	51.00c. to 52.00c.
Copper, Lake	10.25c. to 11.25c.
Copper, electrolytic	10.25c. to 11.25c.
Copper, castings	10.00c. to 11.00c.
*Copper sheets, hot-rolled	16.25c.
*High brass sheets	14.62 $\frac{1}{2}$ c.
*Seamless brass tubes	16.62 $\frac{1}{2}$ c.
*Seamless copper tubes	16.75c.
*Brass rods	13.12 $\frac{1}{2}$ c.
Zinc, slabs	5.75c. to 6.75c.
Zinc, sheets (No. 9), c. sks, 1200 lb. and over	10.25c.
Lead, American pig	5.00c. to 6.00c.
Lead, bar	6.00c. to 7.00c.
Lead, sheets	8.25c.
Antimony, Asiatic	17.00c. to 18.00c.
Alum, virgin, 99 per cent, plus	23.30c.
Alum, No. 1 for remelting, 99 to 99 per cent	18.50c. to 20.00c.
Solder, $\frac{1}{2}$ and $\frac{1}{2}$ lb.	31.00c. to 32.00c.
Babbitt metal, commercial grades	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	57.50c.
Tin, bar	55.50c.

Copper, Lake

Copper, electrolytic

Copper, castings

Zinc, slabs

Lead, American pig

Lead, bar

Antimony, Asiatic

Babbitt metal, medium grade

Babbitt metal, high grade

Solder, $\frac{1}{2}$ and $\frac{1}{2}$ lb.

Copper, hvy. crucible

Copper, hvy. and wire

Copper, light and bottoms

Brass, heavy

Brass, light

Hvy. machine composition

No. 1 yel. brass turnings

No. 1 red brass or compos. turnings

Lead, heavy

Zinc

Cast aluminum

Sheet aluminum

Dealers' Buying Prices

Dealers' Selling Prices

Copper, hvy. crucible

Copper, hvy. and wire

Copper, light and bottoms

Brass, heavy

Brass, light

Hvy. machine composition

No. 1 yel. brass turnings

No. 1 red brass or compos. turnings

Lead, heavy

Zinc

Cast aluminum

Sheet aluminum

THE IRON AGE, December 5, 1935-91

More Cuts Per Hour

Saws 3,350 Pieces in 10 Hours

3,350 pieces in 10 hours—an average of more than 5½ cuts per minute all day long with a small Ryerson-Kling Saw. In this instance the material cut was 1¼" square pipe having a 3/16" wall and it was cut into 3'2" lengths.

Ryerson-Kling High Speed Friction Saws cut everything—beams, rails, channels, rounds, etc., in rapid succession, without clamping or changing attachments. They do it cheaper and faster.

Let us send you data on what others are doing with these saws. Write for Bulletin 25 C.

Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Boston, Cleveland, Buffalo, Philadelphia, Jersey City.



RYERSON-KLING FRICTION SAWS

Fabricated Structural Steel

Lettings Decline—New Projects Higher

AWARDS of 16,425 tons compare with 23,100 tons last week. The outstanding bookings are 4600 tons for the Seventy-ninth Street grade crossing in New York, 2340 tons for depressed track work for the New York Central from Thirty-fifth to Forty-first Streets, New York, and 1260 tons for a high school in Philadelphia. New projects total 24,900 tons as against 21,250 tons in the previous week and 14,300 tons two weeks ago. New jobs include 5000 tons for WPA grade crossings in the State of New York, 2000 tons for a municipal auditorium in Kansas City, Mo., and 2000 tons for a bascule bridge on Outer Drive in Chicago. Plate lettings call for 3400 tons with 38,325 tons pending. Included in awards of 5640 tons for sheet piling is 4600 tons for locks at Peoria, Ill. Structural steel contracts in November total 76,680 tons compared with 50,225 tons in October and 86,150 tons in September. Structural steel awards for the week follow:

NORTH ATLANTIC STATES

North Turner, Me., 240 tons, State bridge, to Pittsburgh-Des Moines Steel Co.

Roxbury, Mass., 100 tons, Robert Gould Shaw school repairs, to Bethlehem Fabricators, Inc.

Weymouth, Mass., 175 tons, Main Street bridge over New York, New Haven & Hartford tracks, to Boston Bridge Works, Inc.

New York, 2340 tons, depressed track work for New York Central, West Thirty-fifth to West Forty-first Street, to American Bridge Co.

New York, 4600 tons, Seventy-ninth Street grade crossing separation; from Frederick Shure Corp., general contractor, to McClinton-Marshall Corp.

Flushing, N. Y., 215 tons, Saint Mary's Roman Catholic School, to Devoe Iron Works.

Long Island City, N. Y., 880 tons, public school No. 166 on Thirty-fifth Avenue, to Harris Structural Steel Co.

Mount Vernon, N. Y., 220 tons, garage for Borden's Farm Product Co., to McClinton-Marshall Corp.

Pleasant Valley, N. Y., 205 tons, State highway bridge, to Harris Structural Steel Co.

Auburn, N. Y., 315 tons, State highway bridge, to McClinton-Marshall Corp.

Philadelphia, 1260 tons, North East high school building, to Fort Pitt Bridge Works Co.

Beaver County, Pa., 238 tons, bridge, to Pittsburgh Bridge & Iron Co.

Washington, 200 tons, tuberculosis sanatorium, to Barber & Ross, Inc.

SOUTH AND SOUTHWEST

Lakeland, Fla., 115 tons, airplane hangar, to Ingalls Iron Works Co.

Hughes County, Okla., 130 tons, bridge, to Capitol Steel & Iron Co.

State of Texas, 380 tons, Sabine River bridge, to Virginia Bridge & Iron Co.

CENTRAL STATES

State of Michigan, 360 tons, highway bridges at Batavia and Temperance, to McClinton-Marshall Corp.

Dearborn, Mich., 130 tons, State highway bridge, to Whitehead & Kales, Inc.

Portsmouth, Ohio, 143 tons, pattern shop for Wheeling Steel Corp., to Riverside Steel Co.

Granite City, Ill., 700 tons, strip mill for Granite City Steel Co., to Stupp Brothers Bridge & Iron Co.

Jefferson County, Neb., 145 tons, viaduct, to Omaha Steel Works.

WESTERN STATES

El Paso County, Colo., 370 tons, bridge, to Minneapolis-Moline Power Implement Co.

State of Wyoming, 115 tons, Belle Fourche River bridge, to Midwest Steel & Iron Co.

Long Beach, Cal., 125 tons, Garfield school alterations, to Minneapolis-Moline Power Implement Co.

Los Angeles, 960 tons, intake and Gene pumping plant, to Consolidated Steel Corp.

Los Angeles, 160 tons, University high school alterations, to Pacific Iron & Steel Co.

Southern Pacific Co., 1000 tons, plate girder at Guadalupe, Cal., to American Bridge Co.

Eagle Creek, Ore., 600 tons, bridge, to Poole & McGonigle, Inc.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Westfield, Mass., 150 tons, State institution unit.

New York, 12,000 tons, section of West Side elevated highway, Forty-sixth to Fifty-ninth Streets; revised bids to be taken by Borough of Manhattan, Dec. 18.

New York, 780 tons, Madison Square postal station.

State of New York, 1560 tons, highway bridges.

State of New York, 5000 tons, grade crossings approved by WPA in different counties; bids Dec. 3, 6 and later.

Rochester, N. Y., 150 tons, high school; general contract bids Dec. 26.

State of New Jersey, 1100 tons, various highway bridges; bids on Dec. 16.

State of Pennsylvania, 560 tons, highway bridges at Bradford and Jersey Shore.

THE SOUTH

Norfolk & Western Railroad, 700 tons, bridge at Grundy, Va.

State of North Carolina, 550 tons, highway bridges.

Frankford, Ky., 1030 tons, State highway bridge.

State of Texas, 575 tons, bridges.

CENTRAL STATES

Battle Creek, Mich., 325 tons, bridge.

Cleveland, 100 tons, public library garage.

Cleveland, 700 tons, 12 schools, including 300 tons for addition to West high school, and 150 tons for James Ford Rhodes high school.

Cincinnati, 525 tons, city water purification plant.

State of Indiana, 360 tons, bridges; bids Dec. 10.

St. Clair County, Ill., 603 tons, overhead near French Village; St. Louis Structural Steel Co., low bidder.

State of Illinois, 600 tons, bridges; bids Dec. 13.

Chicago, 100 tons, dental building for University of Illinois.

Chicago, 150 tons, foundations on Outer Drive.

Chicago, 2000 tons, single leaf bascule bridge on Outer Drive.

Weldon Springs, Mo., 4925 tons, superstructure for highway bridge over Missouri River; Kansas City Bridge Co. low bidder on general contract.

St. Louis County, Mo., 270 tons, highway bridge over Meramec River; bids Dec. 6.

St. Louis, 200 tons, service building for city hospital; Selden-Breck Construction Co., low bidder on general contract.

Kansas City, Mo., 2000 tons, municipal auditorium.

WESTERN STATES

San Francisco, 1000 tons, livestock exhibition building.

Ben Lomond, Cal., 125 tons, two State bridges; bids Dec. 18.

Los Angeles, 795 tons, State overhead crossing at Figueroa Street; bids Dec. 19.

Los Angeles, 287 tons, State overhead crossing at Soto and Valley Boulevard; bids Dec. 19.

Los Angeles, 500 tons, State undergraduate crossing at Mission Road; bids Dec. 19.

Los Angeles, 437 tons, State undergraduate crossing under Union Pacific tracks; bids Dec. 19.

Long Beach, Cal., 120 tons, city tank support; bids Dec. 6.

Ephrata, Wash., 110 tons, State undergraduate crossing; bids Dec. 17.

Skamania County, Wash., 278 tons, State bridge over Little White Salmon River; bids Dec. 17.

Spokane, Wash., 400 tons, shapes, city power house; bids Dec. 5.

Seattle, Wash., 188 tons, city bridge on North Queen Ann Drive; bids opened.

State of California, 600 tons, highway bridges.

State of Oregon, 250 tons, highway bridges at Ashland and Heppner.

FABRICATED PLATES

AWARDS

St. George, Utah, 500 tons, 11½ miles of 12 to 16-in. welded pipe, to Consolidated Steel Corp.

Los Angeles, 2000 tons, intake and Gene pumping plant, to Consolidated Steel Corp.

Vista, Cal., 901 tons, 8 to 26-in. welded pipe, to Consolidated Steel Corp.

NEW PROJECTS

Perry, N. Y., 250 tons, elevated tanks; Chicago Bridge & Iron Works low bidder.

Cleveland, 750 tons, 30-in. welded pipe; bids Dec. 7.

Long Beach, Cal., 1800 tons, six tanks for city; bids Dec. 6.

Los Angeles, 27,000 to 35,000 tons (16.47 miles), 9-ft. 8-in. to 12-ft. precast or steel pipe for Metropolitan Water District, Specification No. 137; bids Jan. 7.

San Francisco, 1300 tons, 36-in. welded pipe for United States Treasury Department; Steel Tank & Pipe Co. low bidder.

Tacoma, Wash., 525 tons, third unit of Green River pipe line; bids Dec. 6.

SHEET PILING

AWARDS

New York, 600 tons, for Triborough bridge, originally ordered from German mill, divided as follows: 330 tons to Carnegie Illinois Steel Corp., 20 tons of new piling and 250 tons of second-hand piling to Jones & Laughlin Steel Corp.

New York, 450 tons, for Triborough bridge, to Carnegie-Illinois Steel Corp.

Peoria, Ill., 4600 tons, locks, to Inland Steel Co.

NEW PROJECTS

Sausalito, Cal., 360 tons sheet piling, yacht harbor; new bids Dec. 10.

Spokane, Wash., 300 tons, city power house; bids Dec. 5.

X. Henry Goodnough, Inc., 14 Beacon Street, Boston, is consulting engineer.

Niagara Falls, N. Y., will take bids Dec. 6 on 350 tons of 54-in. for waterworks beds.

Jeffersonville, Ohio, plans pipe lines for water supply; also other waterworks installation. Fund of \$55,000 is being arranged. H. Collins Wight, Union Trust Building, Dayton, Ohio, is consulting engineer.

Hazel, Ky., closes bids Dec. 10 for pipe for water supply and other waterworks installation. Fund of \$25,455 has been secured through Federal aid.

Paden City, W. Va., closes bids Dec. 9 for about 5000 ft. of 2 to 8-in. for water system; also for 100,000-gal. steel tank. Bernard G. Sampson Co., Fairmont, W. Va., is consulting engineer.

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Costs*

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Valuable in stock room and maintenance work, this speedy metal cutting band saw runs continuously without coolant, saves time and labor costs because of its extreme precision and ability to cut all shapes and thicknesses of metal within the capacity of the machine. Simple to operate, with rigid saw guides to insure accuracy, the rapid adjusting swivel, two-piece vise makes it easy to cut at any angle without stopping to adjust the material or the machine. Learn more about its advantages. Send for the circular today.

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Graysville, Tenn., plans pipe lines for water system; also other waterworks equipment. Fund of \$43,000 has been arranged through Federal aid.

Gainesville, Ga., closes bids Dec. 13 for pipe for water systems; also for elevated tank, filtration plant and other waterworks installation. Wiedeman & Singleton, Inc., Candler Building, Atlanta, Ga., is consulting engineer.

Longview, Tex., plans pipe lines from new water supply source at Little Sandy Creek for trunk line to city; also smaller sizes for extensions in distribution system. Bond issue of \$250,000 has been voted.

Manchester, Okla., plans about four miles of various sizes for water system. Financing is being arranged through Federal aid.

Portland, Ark., plans pipe lines for water system. Fund of \$34,000 has been arranged through Federal aid for this and other waterworks installation. H. R. Carter, Little Rock, Ark., is consulting engineer.

Mendon, Ill., will open bids Dec. 6 for a waterworks system, including 60,000-gal. elevated steel tank on 100-ft. tower, and 25,620 ft. of 2, 4 and 6-in. cast iron pipe. Russell & Axon, St. Louis, are engineers.

Loomis, Neb., plans pipe lines for water system. Fund of \$21,700 has been arranged through Federal aid for this and other waterworks installation. Henningson Engineering Co., Union State Bank Building, Omaha, Neb., is consulting engineer.

Edgemont, S. D., closes bids Dec. 13 for pipe for water system and other waterworks equipment. Fund of \$41,000 has been arranged through Federal aid. Roy B. Baker is city engineer.

Belview, Minn., closes bids Dec. 14 for 7117 ft. of 2 to 8 in. for water system; also for 40,000-gal. elevated steel tank on 100-ft. tower, with alternate bids for wood stave tank on 100-ft. steel tower; pumping machinery and auxiliary equipment. F. H. Anthony, Redwood Falls, Minn., is consulting engineer.

Sheridan, Wyo., will soon take bids for 80,600 ft. of 16 and 18-in. for water trunk line; also smaller sizes for distribution system. Fund of \$793,500 has been arranged through Federal aid for this and

other waterworks construction, including 300,000-gal. steel or concrete reservoir, filter plant and other structures. Daniel J. McQuaid, 422 North Main Street, is consulting engineer.

Whitney, Idaho, opened bids Dec. 4 on 100 tons of 3 and 4-in.

South Gate, Cal., is arranging financing for pipe lines for water supply in Magnolia Park district. Cost about \$125,000. Guy Nevill is city engineer.

San Bernardino, Cal., has let 158 tons of 4 to 8-in. to National Cast Iron Pipe Co.

San Diego, Cal., has opened bids on 170 tons on which United States Pipe & Foundry Co. is low bidder.

Oakland, Cal., received a bid only from United States Pipe & Foundry Co. on 850 tons of 8 to 16-in.

Dos Pales, Cal., has opened bids on 320 tons of 4 to 8-in.

Cascade Locks, Ore., has opened bids on 250 tons.

Snohomish, Wash., closes bids Dec. 11 for about six miles of 4, 6, 8 and 12-in. for water supply, with valves, fittings, etc. Fund of \$47,200 has been secured through Federal aid. Elmer Lenfest is city engineer.

Ridgefield, Wash., asks bids until Dec. 10 for about 15,600 ft. of 4 to 8-in. for water system. Charles Deako, Court House, Vancouver, Wash., is consulting engineer.

Pipe Lines

Board of Public Service, St. Louis, closes bids Dec. 13 for 60-in. welded steel pipe for pressure conduit lines from Howard Bend pumping station to Stacy Park reservoir. Cost over \$600,000.

Pasotex Pipe Line Co., El Paso, Tex., an interest of Pasotex Refining Co., same place, is considering new welded steel pipe line from present terminus in Herkicks County to oilfield district in Ward County, about 40 miles, for additional crude oil supply for refinery of Pasotex Refining Co. Both companies are con-

trolled by Standard Oil Co. of California, San Francisco.

Deming, N. M., has plans for steel pipe line for natural gas distribution. Cost about \$40,000. Financing has been arranged through Federal aid. C. B. Morgan, Deming, is engineer in charge.

East Bay Municipal Utility District, Oakland, Cal., has rejected bids received Nov. 13 for construction of Crockett tunnel section, Richmond-Crockett water supply line, including 1380 ft. of 42-in. steel pipe, and will carry out work by day labor.

Freddell Construction Co., Houston, Tex., has contract from group of independent oil operators in Samfordyce, Tex., oil field district, for new 4-in. welded steel pipe line from that district to McAllen, Tex., for natural gas, about 30 miles in all.

Bureau of Reclamation, Denver, asks bids until Dec. 9 for fabricated pipe and fittings for Boulder power plant, Boulder Canyon Project, Arizona-California-Nevada (Specifications 750-D).

Airlane Refining & Transportation Co., Ltd., is contemplating construction of 165-mile pipe line between Kettleman Hills and Stockton, Cal., where refinery will be located. Approximately 9000 tons of 10-in. steel pipe will be required. W. E. Dorn, 1103 Hearst Building, San Francisco, is president.

This Week on the Assembly Line

(CONTINUED FROM PAGE 51)

original cost of the small units, plus the legal restrictions imposed by many States on the large vehicles, the heavy-duty truck makers are going to have a tough time with their markets and many observers think they have permanently lost a substantial share of this business. The logical thing is for the heavy-duty people to tie in with the light truck companies or build small units themselves.

The Motor Products strike has about spent itself although union members still go through the motions of picketing the plant. The company has at work a full day force and Monday night started operating a night force. Leaders of the strike, Matthew Smith and Richard Frankenstein, requested the past week that a Federal conciliator be sent from Washington.

Robert Mythen was dispatched to Detroit and has been in conference with both the independent unions conducting the strike and the Motor Products management. The latter is said to contend that there is nothing to be decided and that it is in satisfactory production. The conciliator's efforts are looked upon as a face-saving measure for the union. During the past week the A. F. of L. local union members returned to work at Motor Products through the picket lines established by the rival unions. Through the entire strike Motor Products is reported to have had the whole-hearted backing of all car manufacturers.

Recent Developments And Trends in Refractory Processes and Materials

(CONTINUED FROM PAGE 29)

Operators of metal-working furnaces seem to have been the quickest to realize on the use of the insulating refractories, and so far they have received their widest usage in forge, heat-treating and annealing furnaces. The brick are limited in usefulness. They are not particularly suitable as hearth and roof brick because of their inability to withstand the slags and abrasion prevailing in the former, and the stresses particularly in the sprung-arch type of the latter. The first of these brick marketed were recommended for furnace temperatures of not over 1400 deg., but now brick recommended for service up to 1650 deg. C. are available. To reduce heat loss by radiation from hearths and roofs, a back-up type of insulation is required, but the savings by preventing losses from heat storage in the setting are not realized.

Future Developments Discussed

Big strides have been made in the displacement of misfit brick in consumers' furnaces. Such compromises as using acid brick in contact with basic oxides and slags, because basic brick have been weak structurally, undoubtedly will not be tolerated as complacently as in the past. The continuing physical improvements and use of basic brick have demonstrated that silica brick in particular, as well as clay and high alumina brick, may eventually cease to be used in operations where they formerly were considered indispensable. The tonnage of basic refractories used should accordingly continue to increase.

The development of insulating refractories for lining furnaces has so far been limited largely to those made of fireclay. There are no great obstacles to prevent the fabrication of cellulated products in the other well known refractory materials, should these prove desirable. If the insulating refractories could be made impermeable by some treatment of the fire face to resist slag and gas penetration, an obstacle to their more extensive use would be removed. The future

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will undoubtedly see the construction of many more furnaces lined with these products with the elimination of the heavy walls now in use. The chief function of these heavy walls is to confine heat and support heavy roofs. Suspended walls and roofs have progressed to the point where heavy supporting masonry is not as necessary as in the past and small furnaces made entirely of insulating firebrick are now being built. The heavy tonnages of fireclay and silica brick consumed in the past will undoubtedly be less for these reasons, as well as those cited before.

The use of insulation on the exteriors of furnaces, regenerator chambers and other points where it is of interest to bring about greater heat economy by retarding heat losses from radiation and convection has had the effect of increasing the mean temperatures prevailing in the refractories used for furnace linings. Accordingly, shrinkage and spalling, as well as the fluxing action of slags and dusts, have increased. A trend which will continue is the improvement in physical properties of the refractories now in use, to withstand the increased severity of these destructive agencies.

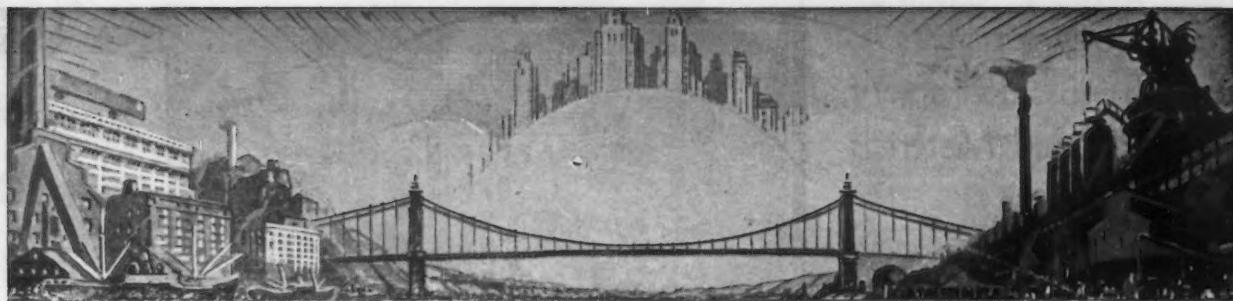
In general, the research facil-

ties of manufacturers are on a higher plane than ever before, and a better understanding has been gained of the fundamental properties of refractory materials and their relation to service requirements. With some very distinct gains in the manner of processing materials, headway should proceed in the development of latent properties which will make the refractories of the future better suited to the varying demands that will be made upon them.

U. S. Pipe to Build At Chattanooga

UNITED Engineers & Constructors, Inc., have been retained by United States Pipe & Foundry Co. to construct a new plant at Chattanooga, Tenn., from plans and specifications of United States Pipe & Foundry Co. prepared under direction of Edward Hering, chief engineer.

Granite City Steel Co., Granite City, Ill., has moved its Chicago district sales office to the Willoughby Tower, 8 South Michigan Boulevard.



Plant Expansion and Equipment Buying

Machine Tool Orders Continue Light; Packard Soon To Enter Market

ORDERS for machine tools continue rather light, despite the fact that the volume of inquiries is still relatively heavy. It is apparent that prospective purchasers do not intend to make further extensive commitments before the first of the year. Sellers are not surprised at this policy and are not allowing buyers to forget their existence because of lack of sales effort. Interest developed at the machine tool show is being actively followed up in all instances, and both distributors and direct producer representatives are very busy.

Packard is not expected to close for another week on the equipment required for a new six-cylinder car it will introduce in the spring. It is not yet known how much will be spent on machinery, but the outlay is expected to be large. Other automobile companies are not showing much interest in their equipment needs.

◀ NORTH ATLANTIC ▶

National Distillers Products Corp., 120 Broadway, New York, has acquired former plant of E. H. Taylor Distillery, Frankfort, Ky., and will remodel for branch plant. It will be operated in conjunction with Old Crow Distillery of purchasing company, on adjoining site. Cost over \$400,000 with equipment.

Board of Education, 500 Park Avenue, New York, plans manual training department in new three-story junior high school at 2401-2511 Neptune Avenue, Brooklyn. Cost \$1,200,000 with equipment. William C. Martin, Flatbush Avenue Extension and Concord Street, Brooklyn, is architect.

Feeders Mfg. Co., Inc., 106 East Nineteenth Street, New York, manufacturer of automobile radiators, refrigeration equipment, etc., with main plant at Buffalo, has leased floor in building at 114-16 East Sixteenth Street for factory branch and service plant.

New York State Electric & Gas Corp., Albany, N. Y., plans rebuilding equipment storage and distributing plant at Brewster, N. Y., recently destroyed by fire. Loss over \$125,000 with equipment.

Samuel Cupples Envelope Co., 7 Laight Street, New York, has leased 50,000 sq. ft. in building at 360 Furman Street, Brooklyn, for new paper-converting works, and will remove to new location and increase capacity.

Melaver & Kaplan, Inc., 419 East 101st Street, New York, manufacturer of lubricating oils, etc., has purchased building of Quaker City Metal Products Corp.,

194-96 North Fourteenth Street, Brooklyn, for new plant.

White Co., 31-10 Thompson Avenue, Long Island City, manufacturer of motor trucks, with main plant at Cleveland, is acquiring property in Brooklyn for new factory branch, service and parts plant.

DuPont Rayon Co., Inc., 350 Fifth Avenue, New York, has plans for one-story addition to branch mill at Amphi Hill, near Richmond, Va., for which superstructure will begin early in 1936. Cost over \$75,000 with equipment.

Schenley Distillers Corp., 20 West Fortieth Street, New York, has begun expansion and improvements in George T. Stagg Co., distillery, Frankfort, Ky., a subsidiary, to double capacity. Cost over \$400,000 with machinery. Company will build two-story and basement addition to James E. Pepper Distillery, Lexington, Ky., another subsidiary, for storage and distribution. Cost close to \$125,000 with equipment. A preferred stock issue of about \$15,000,000 is being arranged, part of fund to be used for work noted and other expansion. Carl J. Kiefer, Schmidt Building, Cincinnati, is vice-president in charge of plant construction.

Central School District No. 1, Berlin, N. Y., plans manual training department in new three-story school. Cost about \$200,000. Financing has been arranged through Federal aid. H. O. Fullerton, 152 Washington Avenue, Albany, N. Y., is architect.

State Purchase Commissioner, State House, Trenton, N. J., asks bids until December 10 for corrugated metal pipe; also for steel blanks for automobile license plates.

Co-Operative Grange League Federation Mills, Inc., Chamber of Commerce Building, Buffalo, manufacturer of commercial fertilizers, etc., has begun erection of first unit of new branch plant at Kearny, N. J., where former property of Valentine Varnish Co. was recently acquired. Cost about \$50,000 with equipment. Other units will be built later, with ultimate investment over \$200,000 including machinery.

Philadelphia Spring Works, Inc., 1310 Poplar Street, Philadelphia, manufacturer of steel springs, etc., has purchased adjoining industrial plant, on site 61 x 177 ft., and will remodel for new works.

Delaware River Joint Commission, Administration Building, Bridge Plaza, Camden, N. J., Joseph K. Costello, secretary, asks bids until December 13 for track parts and other equipment for high speed transit line between Camden and Philadelphia, equipment to be delivered in last noted city.

◀ NEW ENGLAND ▶

General Electric Co., Boston Avenue and Bond Street, Bridgeport, Conn., has let general contract to Gelatly Construction Co., Housatonic Avenue, for one-story addition, 80 x 100 ft. Headquarters are at Schenectady, N. Y.

Bethlehem Shipbuilding Corp., Quincy, Mass., has plans for one-story galvanizing shop at Fore River shipyard, 40 x 60 ft. Cost about \$85,000 with equipment.

Underwood-Elliott Fisher Co., Arbor and Orange Streets, Hartford, Conn., manufacturer of typewriters and parts, calculating machines, etc., has asked bids on general contract for one-story addition and improvements in present plant. Lockwood, Greene Engineers, Inc., 30 Rockefeller Plaza, New York, is architect and engineer. Company headquarters are at 342 Madison Avenue, New York.

School Board, Turners Falls, Mass., plans manual training department in new two-story and basement high school. Cost about \$150,000. Financing has been concluded through Federal aid. H. E. Mason, 15 Prospect Street, is architect.

Porcupine Co., Post Road, Fairfield, Conn., manufacturer of steam boilers, etc., has taken out permit for one-story addition, about 20 x 55 ft.

◀ BUFFALO DISTRICT ▶

United Shoe Machinery Corp., 126 Mill Street, Rochester, N. Y., has let general contract to Borden Construction Co., 1 Endicott Avenue, Johnson City, N. Y., for one-story addition to branch plant at Johnson City. Cost about \$65,000 with equipment. Headquarters of company are at Boston.

John Morrell & Co., 111 North West Street, Syracuse, N. Y., meat packer, will soon take bids on general contract for one-story addition, in part for storage and distribution. Cost over \$45,000 with

A MACHINE THAT MAY SAVE YOU THOUSANDS OF DOLLARS

On Production Assembly Work



INGERSOLL-RAND POTT IMPACT WRENCH

Every mechanical operation in production manufacture has been speeded up — only assembly has often lagged behind.

Now with the new Ingersoll-Rand Pott Impact Wrench many assembly operations get in step with the production program.

This new Pneumatic Wrench seats and tightens bolts, nuts and screws faster and the work is more certain, more uniform. It handles harder, heavier work than other pneumatic devices, yet weighs about half as much, uses about half as much air.

It removes frozen nuts—there is no hammering to loosen. It is built on safety-first principles—no danger of injury to the operator.

USE THIS COUPON

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11 BROADWAY, NEW YORK

Please send me a copy of your new Pott Impact Wrench Bulletin.



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POSITION

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COULD your material be handled over a more expeditious route — could a congested floor space be relieved — operations speeded — handling costs reduced? In the application of elevating and conveying equipment, the selection of the correct type for the service and material to be handled, is of prime importance. Link-Belt offers its broad experience in the art of handling materials mechanically, whether your problem involves a new installation or the revamping and repair of present-running equipment.

Its line includes every known type of elevating and conveying equipment for handling all materials. Send for catalogs.

LINK-BELT COMPANY

Chicago Indianapolis Philadelphia
Atlanta San Francisco Toronto
Offices in Principal Cities
5393



equipment. H. Peter Henschien, 59 East Van Buren Street, Chicago, is architect and engineer.

Rosen Brothers Corp., Cortland, N. Y., has been organized by Anthony F. Cafrey, 242 Buckingham Avenue, Syracuse, N. Y., and associates, to manufacture metal products.

Board of Education, 120 West Genesee Street, Syracuse, N. Y., plans multi-story addition to vocational high school on Oswego Street. Cost over \$250,000 with equipment. It is proposed to begin work early in 1936.

SOUTH CENTRAL

Falls City Brewing Co., Thirty-first Street and Broadway, Louisville, plans one-story addition, 200 x 300 ft., primarily for a mechanical-bottling works. Cost close to \$100,000 with machinery. Company has superstructure under way on another plant addition for storage and distribution, to cost about \$60,000 with equipment. Benjamin H. Schrader is president.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until Dec. 9 for miscellaneous metal parts for

temporary upper gate at Pickwick Landing Lock.

Daviess County Distillery Co., Owensboro, Ky., has plans for one-story addition, in part for a mechanical bottling department, with remainder of space for storage and distribution. Cost close to \$65,000 with equipment.

City Council, Memphis, Tenn., is considering erection of municipal grain elevator, for which fund of \$235,000 has been arranged. Installation will include elevating, conveying, screening and other mechanical equipment. MacDonald Engineering Co., 1 North LaSalle Street, Chicago, is consulting engineer. William B. Fowler is city engineer.

Dorgan-McPhillips Packing Co., Columbia, Miss., food canner, plans one-story addition to double present capacity. Cost over \$45,000 with machinery.

Labrot & Graham, Glenn's Creek Road, Frankfort, Ky., plans one-story addition to distillery, primarily for a mechanical bottling unit. Cost over \$40,000 with equipment.

Monroe County Electric Power Association, Monroe, Miss., plans transmission and distributing lines for rural electrification, about 51 miles, including service facilities. Fund of \$81,000 has been arranged.

WASHINGTON DIST.

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until Dec. 19 for automobile parts (Circular 69).

Bureau of Yards and Docks, Navy Department, Washington, asks bids until January 15 for motor-driven fuel oil pump, piping and auxiliary equipment for Naval Fuel Depot, Pearl Harbor, T. H. (Specification 7447).

Columbia Specialty Co., 1508 East Fayette Street, Baltimore, manufacturer of cans and containers, has acquired factory at 6301 Eastern Avenue, including adjoining land, and will remodel for new plant.

Veterans' Administration, Procurement Division, Arlington Building, Washington, asks bids until Dec. 9 for valve refacing tools (Proposal 253-M).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 10 for seamless copper tubing (Schedule 6535) for Eastern and Western Navy Yards; until Dec. 13, 9500 ft. corrosion-resisting steel cable and 59,000 ft. tinned steel cable (Schedule 6535) for Eastern and Western and Philadelphia yards; until Dec. 17, designing and constructing one steel ferryboat (Schedule 6568).

United States Engineer Office, Navy Building, Washington, asks bids until Jan. 8 for motor-driven pumping machinery and electrical equipment for McMillan pumping station, Washington Aqueduct.

MIDDLE WEST

Lindberg Steel Treating Co., 218 North Union Park Court, Chicago, has let general contract to Magnusen & Wold, 4322 Drummond Place, for new one-story plant, 58 x 144 ft., at 1501-13 Fulton Street. Cost about \$35,000 with equipment. Robert C. Ostergren, 4300 North Clark Street, is architect.

Matchless Metal Polish Co., 833 West Forty-ninth Place, Chicago, manufacturer of polishes, oils, compounds, etc., has let general contract to A. T. Herlin & Son, 6816 Clyde Avenue, for two-story addition, 61 x 140 ft. Cost about \$40,000 with equipment. A. Epstein, 2001 West Pershing Road, is architect and engineer.

Glidden Co., Soya Products Division, 1845 North Laramie Avenue, Chicago, a division of Glidden Co., Cleveland, is rebuilding part of six-story plant recently destroyed by fire. Cost close to \$500,000 with equipment.

Town Council, Hopkinton, Iowa, asks bids until Dec. 10 for new municipal electric light and power plant, including two

It is...

EVERY ONE OF THE FOUR!



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UNIFORM!



FLEXIBLE!



STRAIGHT!

IT'S Roebling Cold Rolled High Carbon Steel Flat Wire . . . tempered, polished, straw-colored or blued . . . made to very exacting specifications. Only one of hundreds of Roebling cold rolled steel "flats" . . . but an excellent example of the kind of flat wire in which Roebling specializes.

Toughness...uniformity...flexibility...flatness. Quite an order!...but one

which this Roebling Flat Wire must fill and does.

If you require cold rolled steel flat wire of high quality . . . if your requirements are severe as to temper, dimensions, strength, pliability, forming, or other qualities . . . it would pay you to investigate our product. We have specialized in this business for over 40 years . . . and have developed exceptional facilities to handle it.



Roebling Cold Rolled Flat Wire is made from both high carbon and low carbon steels, produced in Roebling's own mills. The high carbon flat wire is available in tempered and untempered types.

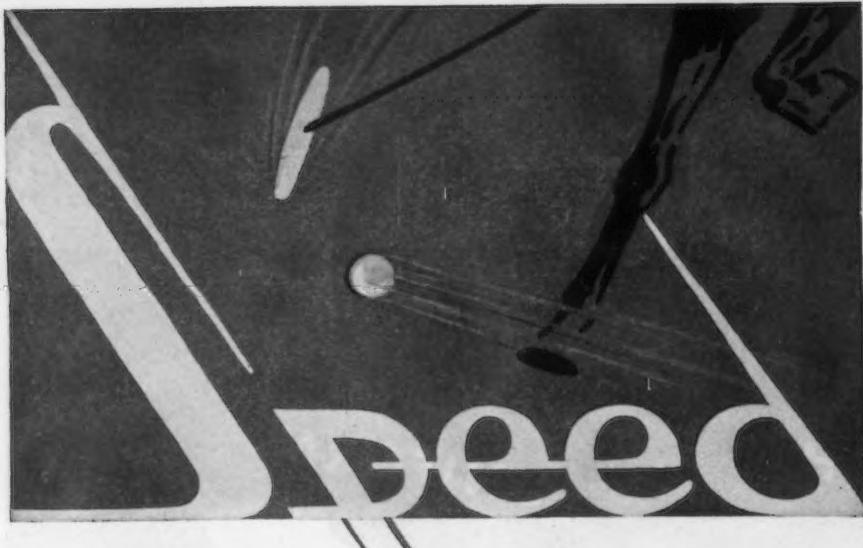
Finishes:—bright, black annealed, bright annealed, tinned, japanned, galvanized, blued, straw-colored, coppered.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, N.J. Branches in Principal Cities



ONLY A FINE PRODUCT MAY BEAR THE NAME ROEBLING

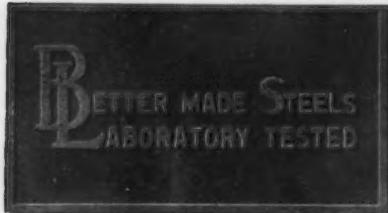
THE IRON AGE, December 5, 1935—99



POLO is a fast-moving game that calls for a finely balanced combination of quick thinking and hard riding—a man with nerves of steel, and a horse with the courage of a thoroughbred.

Whether in polo playing or in steel working, the prime factor is *time*. Speed is what counts in making goals on the field, or in making parts on an automatic screw machine. Ultra-Cut Steel is a "ten goaler" at this job and is groomed for speed like a thoroughbred.

It behaves beautifully under the tool, producing clean-cut threads, smooth machined surfaces, flawless finished parts—and at a production rate of 30% to 40% higher than with ordinary free-cutting screw stock.



Cold Drawn Bars and Shafting • Extra Wide Flats • Special Sections • Alloy Steels

BLISS & LAUGHLIN, INC.

HARVEY, ILL. Sales Offices in all Principal Cities BUFFALO, N.Y.

Diesel engine-generating units, fuel oil tanks, pumping machinery, switchboard and auxiliary electrical equipment; also for distribution system. Fund of \$68,000 has been arranged. A. S. Harrington, Baum Building, Omaha, Neb., is consulting engineer.

School District No. 1, Silver Bow County, Butte, Mont., plans manual training department in new three-story and basement high school at Butte, for which bids are being asked on general contract until Dec. 14. Cost about \$800,000 with equipment. Bird & Van Teylingen, Medical Arts Building, Great Falls, Mont., are architects.

Owatonna Tool Co., Owatonna, Minn., has plans for two-story addition, 50 x 170 ft. Cost about \$30,000 with equipment.



This threaded reducer was machined at the rate of 103 pieces per hour, using Ultra-Cut Steel, versus 60 pieces per hour with SAE 1112 screw stock, resulting in finer finish and fewer tool grinds.

WRITE FOR ULTRA-CUT FOLDER No. 3-A, which describes other performances of this high speed screw stock.

dition, 90 x 150 ft., three stories and basement, adding 40,000 sq. ft. T. B. Myers is vice-president and general manager at Racine.

Iroquois Foundry Co., Racine, Wis., occupying former Freeman Mfg. Co. foundry on Reichert Street, has purchased former plant of Simplex Furnace Corp., 1600 Layard Avenue, affording 37,000 sq. ft. floor space, and is remodeling with a view toward concentrating on light gray iron production instead of conducting jobbing shop as at present. New plant will be ready about Jan. 15.

Metal Spraying Corp., 3132 West Garfield Avenue, Milwaukee, has transferred operations to shop at 3610 West Pierce Street, increasing floor space five-fold. Peter G. Dennison is general manager.

X-Ray Quality, Inc., Beloit, Wis., has been organized by Louis A. M. Phelan and associates to manufacture new type of X-ray tube in five models for hospital and industrial applications, with instant convertibility from air-cooled to water-cooled type. Production has been started in shop on Fifth Street.

◀ SOUTH ATLANTIC ▶

Board of Public Education, Savannah, Ga., plans manual training department in new three-story high school, for which bids have been asked on general contract. Cost about \$900,000 with equipment. Levy & Clark, 203 East Broughton Street, are architects; Cletus W. Bergen, Liberty Bank Building, is consulting architect.

Hygeia Coca Cola Bottling Co., Pensacola, Fla., asks bids on general contract until Dec. 16 for new two-story bottling plant. Cost about \$100,000 with machinery, including mechanical-handling equipment. Francis P. Smith, Norris Building, Atlanta, Ga., is architect.

Firestone Auto Supply & Service Stores, Inc., 1000 Adams Street, Jacksonville, Fla., has let general contract to G. L. Auchter, 600 East Fourth Street, for one-story addition, in part for automobile body construction and repairs, brake and wheel repairs and service for motor trucks, and other mechanical departments. A similar building is also planned at Ninth and Ma Streets where site has been acquired. W. B. Thompson is general manager.

City Council, Gainesville, Ga., asks bids until Dec. 11 for pumping machinery and accessories, elevated steel tank and tower, and other equipment for municipal waterworks. Fund of \$110,000 has been arranged through Federal aid. Wiedemann & Singleton, Candler Building, Atlanta, Ga., are consulting engineers.

◀ OHIO AND INDIANA ▶

Mansfield Tire & Rubber Co., Mansfield, Ohio, has plans for one-story addition. Cost close to \$30,000 with equipment.

Humphries Mfg. Co., Mansfield, Ohio, manufacturer of pumps, parts, plumbing fixtures, etc., has let general contract to Jacob Wolf Co., 11 West Fourth Street, for two-story addition, 60 x 100 ft. Cost about \$65,000 with equipment.

Isaly Dairy Co., Columbus, Ohio, care of Richard, McCarty & Bulford, 584 East Broad Street, architects, plans installation of conveying, loading and other mechanical-handling equipment in new two-story milk products plant on North High Street. Cost about \$150,000 with machinery.

Board of Education, Lawrenceburg, Ind., plans manual training equipment in new three-story high school, for which bids have been asked on general contract. Cost about \$250,000 with equipment. Edward J. Schulte, 290 East McMillan Street, Cincinnati, is architect.

Hercules Motor Corp., Eleventh Street, S. E., Canton, Ohio, manufacturer of heavy-duty internal combustion engines and parts, has let general contract to Warren-Hoffman Co., 312 Third Street, N. W., for one-story addition, about 46-

OFF with his OVERHEAD!



Every man who is responsible for the care, management and upkeep of property has wondered if it is possible to cut that item of overhead listed as Fire Insurance.

It is possible. Scores of industries—banks—trustees—retailers—know that IRM offers an absolutely sound indemnity at lower cost.

IRM selects its risks. It insures only those properties that meet its standards after inspection and recommendations by its fire-

prevention engineers. By eliminating hazards, it is enabled to cut costs to its policyholders. IRM can show, too, an unbroken record of returns to policyholders during its fourteen years of existence—25% of their premiums annually.

Fifteen companies make up this association. Their records, averaging more than forty years of individual underwriting experience, speak for themselves. We shall be glad to send you the facts and figures.



YOU WOULD WELCOME PRODUCTION METHODS THAT SAVE AS MUCH AS 25%.
MAY WE SHOW YOU HOW WE HAVE CUT INSURANCE COSTS PROPORTIONATELY?

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A nation-wide organization of old established, legal reserve companies writing the following types of insurance: Fire * Sprinkler Leakage * Use and Occupancy * Tornado and Windstorm * Earthquake * Rents * Commissions and Profits * Riot and Civil Commotion * Inland Marine

FARREL NI-HARD ROLLS



A 20" x 42" Farrel Ni-Hard
Roll for finishing non-ferrous sheets.

for quality and economy

Farrel Ni-Hard Rolls have been developed to meet the demand of the metal rolling industries for a roll combining hardness with high strength and a surface free from pinholes, "orange peel," or other imperfections which mark the surface of the sheet.

They are chilled alloy iron rolls with a hardness from 85 to 90 on the Shore Scleroscope, "C" scale, and are the result of long and careful study and experimentation to develop correct mixture, melting practice and heat treatment.

Each step in the manufacturing process is subject to scientific control, including analysis of materials, controlled melting in an electric furnace, precise heat treatment, physical tests and microphotographs.

The performance of Farrel Ni-Hard Rolls in a number of metal rolling mills has definitely proved their superiority. Their greater hardness and better surface produce a sheet with a finish of notably higher quality than can be obtained with chilled or other types of alloy cast rolls. They are also more economical—requiring less scouring and grinding than any other type of cast roll, their life is longer and their cost per ton of output is lower.

Farrel-Birmingham Metal Working and Rolling Mill Equipment includes: Chilled Iron, Special Alloy Iron and Steel Rolls—Rolling Mills—Rod Mill Tables and Manipulating Equipment—Universal Mill Spindles—Rod Coilers—Hydraulic and Mechanical Presses—Lead Presses for Pipe or Rod—Roll Grinding Machines—Roll Calipers—Gears—Mill Pinions—Drives up to 10,000 H.P.

FARREL - BIRMINGHAM

Company, Inc.

100 Main St., Ansonia, Conn.

000 sq. ft. floor space. Cost over \$65,000 with equipment.

Eagle-Picher Lead Co., Temple Bar Building, Cincinnati, has let general contract to Hillsmith & Co., 108 East Third Street, Dayton, Ohio, engineers and contractors, for two-story addition to plant at 1030 Broadway, Cincinnati, primarily for storage and distribution. Cost about \$100,000 with equipment.

Contracting Officer, Material Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until Dec. 11 for 150 fuel pump assemblies (Circular 370), one spot-welded stainless steel aircraft wing and one aluminum-coated aluminum alloy wing (Circular 369); until Dec. 12, 15 light-duty tractors (Circular 373).

Berghoff Brewing Corp., Fort Wayne, Ind., plans extensions and improvements including one-story addition for storage and distribution, and expansion in power house. Cost about \$120,000 with equipment. F. B. Evans is executive vice-president.

American MonoRail Co., 13107 Athens Avenue, Cleveland, manufacturer of overhead conveying equipment, is adding 3000 sq. ft. to its floor space for expansion. No additional machinery is contemplated.

WESTERN PA. DIST.

Westinghouse Electric & Mfg. Co., East Pittsburgh, has acquired plant and business of Mansfield Vitreous Enameling Co., Mansfield, Ohio, for expansion in metal enameling division for refrigerators and

other products. Extensions and improvements are planned, including new equipment. Cost close to \$85,000 with equipment.

Pennsylvania Railroad Co., Central Division, Union Station, Pittsburgh, has plans for new one-story machine shop at Pitcairn, Pa., to replace unit recently destroyed by fire. Cost over \$60,000 with equipment.

Ackerman Mfg. Co., River Road, Warwood, W. Va., manufacturer of pressed steel products, is considering one-story addition. Cost close to \$50,000 with equipment. Company is a subsidiary of Wheeling Steel Corp., Wheeling, W. Va.

MICHIGAN DISTRICT

Covered Wagon Co., 11900 East Jefferson Street, Detroit, manufacturer of automobile trailers, parts, etc., has acquired former factory of National Candy Co., Mount Clemens, Mich., about 110,000 sq. ft. floor space, and will remodel for new plant for increased production. Cost close to \$50,000 with equipment. Company is also purchasing 10-acre tract adjoining acquired plant for future expansion. Arthur G. Sherman is president.

Naph-Sol Refining Co., Muskegon, Mich., plans extensions and improvements in oil refinery, including new steam power house. Cost close to \$40,000 with equipment.

Applied Arts Corp., Grand Rapids, Mich., manufacturer of appliances and equipment for automotive and refrigerator use, has arranged for acquisition of former plant of Grand Rapids Felting Co., and will improve for new works. Company plans one-story addition to acquired plant early in 1936, providing about 40,000 sq. ft. additional floor space. Ralph F. DeBoer is president.

Ford Motor Co., Dearborn, Mich., has plans for addition to power plant, and installation of electrical equipment. Cost close to \$100,000. Giffels & Vallet, Inc., Marquette Building, Detroit, is architect and engineer.

SOUTHWEST

Blatz Brewing Co., 3109-19 Southwest Boulevard, Kansas City, Mo., is considering one-story addition, 25 x 110 ft., and will begin work early in 1936. Cost close to \$45,000 with equipment. O. J. Cheely is general manager.

Cupples-Hesse Envelope Co., 4178 North Kingshighway, St. Louis, plans multi-story addition on adjoining site, about 50,000 sq. ft. floor space, for expansion in paper-converting department. Cost about \$100,000, of which close to \$70,000 will be expended for new equipment.

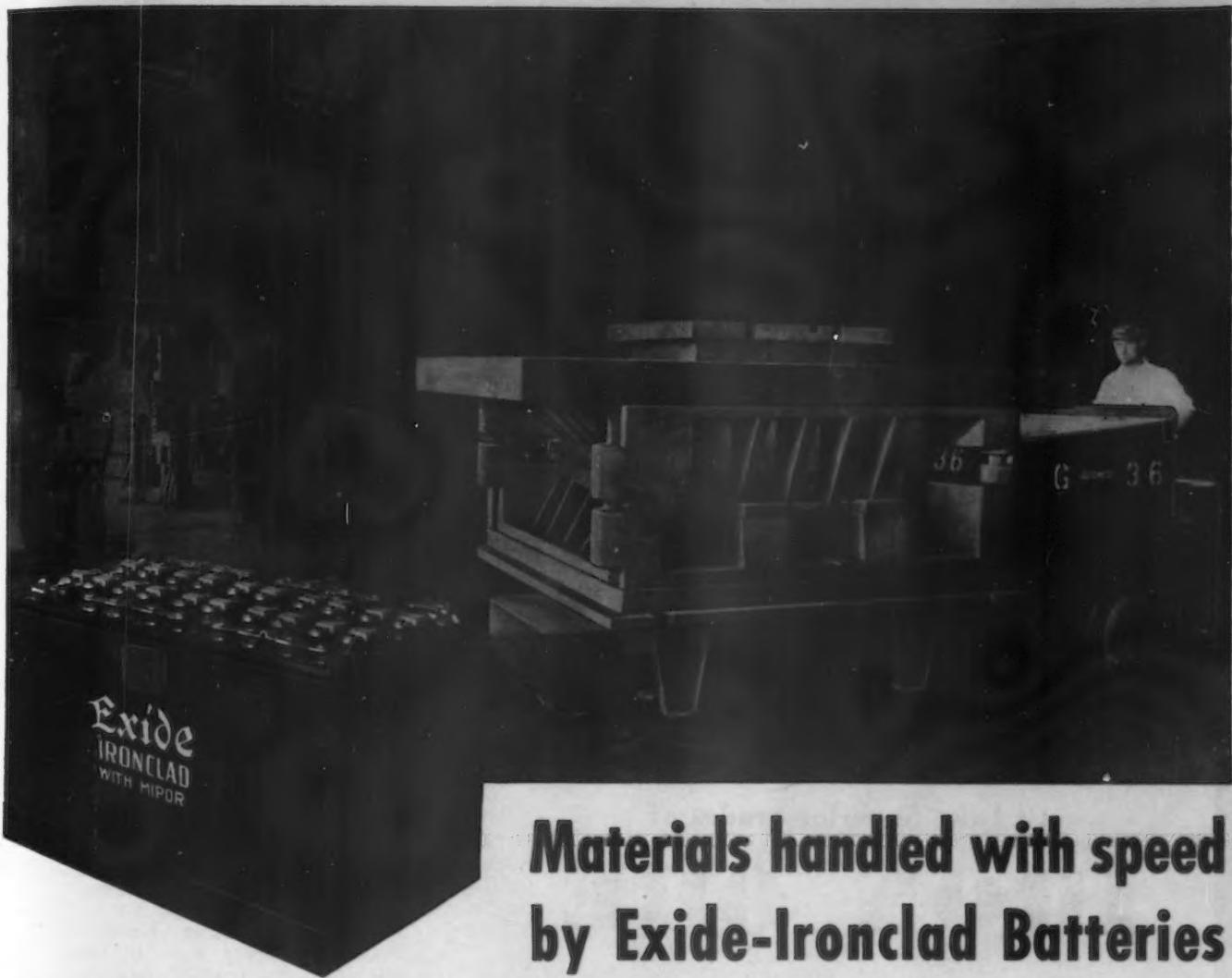
State Highway Commission, Capitol Building, Jefferson City, Mo., T. H. Cutler, chief engineer, will soon begin erection of new two-story and basement equipment storage and distributing building, 70 x 100 ft., with repair and garage facilities, at Willow Springs, Mo. Cost about \$75,000 with equipment.

Wood-Moore Corp., Philtower Building, Oklahoma City, Okla., oil products, has leased tract at Port Lavaca, Tex., for new oil refinery. Steel tanks and other equipment will be installed for storage and distributing department. Cost about \$70,000 with machinery.

City Council, Wynnewood, Okla., will receive bids until Dec. 13 for new municipal electric light and power plant, including equipment. Fund of \$65,000 has been arranged. V. V. Long & Co., Colcord Building, Oklahoma City, Okla., are consulting engineers.

San Antonio Portland Cement Co., San Antonio, Tex., is considering one-story addition to mill, to include division for production of special cast cement units for oil well casings. Cost close to \$125,000 with machinery.

St. Louis-San Francisco Railway, St. Louis, has asked Federal Court for authority to purchase following machine tools during 1936: one AB brake test rack, \$832; three 300-amp. electric welding machines, \$2,490; seven air brake racks,



Materials handled with speed by Exide-Ironclad Batteries

FOR 25 years, Exide-Ironclad Batteries have been moving materials with speed and dependability. Built to go in a truck and stay there for years with the least possible maintenance—they have won a worldwide reputation for reliable performance.

The Exide-Ironclad is built on a fundamental principle different from all other batteries and combines all four of the essential battery characteristics: high power ability, high electrical efficiency, extreme ruggedness, and long life—of utmost importance in electric industrial



truck and tractor service.

The economical service that you get from an Exide-Ironclad Battery today is the result of its

basic design, plus 25 years of constant improvement in the battery. It offers outstanding value from every standpoint—cost, service, dependability and economy. Write for free booklet, "Facts for Consideration in Selecting a Storage Battery."

THE ELECTRIC STORAGE BATTERY CO., Philadelphia

The World's Largest Manufacturer of Storage Batteries for Every Purpose

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BATTERIES
WITH EXIDE MIPOR SEPARATORS

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PIG IRON

five established brands

Federal Iroquois Perry
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COKE

Foundry, Industrial and Domestic

Chicago Solvay
Milwaukee Solvay
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All Lake Superior grades of

IRON ORE

By-product and Steam

COAL

Pickands, Mather & Co.

Cleveland - Chicago - Detroit - Erie - Toledo
Minneapolis - Duluth

\$1,450; one metalizing equipment, \$761;
two shop mules, \$1,824.

destroyed by fire. Loss close to \$60,000
with equipment.

Board of Education, 715 Locust Avenue,
Long Beach, Cal., has asked bids on general
contract for new one-story vocational
training shop and other buildings at Jef-
ferson junior high school. Cost about \$250,-
000 with equipment. Warren Dedrick,
Heartwell Building, is architect; C. D.
Wailes, Jr., Ocean Center Building, is
engineer.

Bureau of Supplies and Accounts, Navy
Department, Washington, asks bids until
Dec. 10 for one main generator engine
lubricating oil pump, motor-driven, with
complete control equipment and spare
parts (Schedule 6499), three electrically-

◀ PACIFIC COAST ▶

General Brewing Corp., 2601 Newhall
Street, San Francisco, has let general con-
tract to Cahill Brothers, 206 Sansome
Street, for two-story addition for storage
and distribution. Cost close to \$50,000
with equipment. F. H. Meyer, 525 Market
Street, is architect; C. H. Snyder, 251
Kearny Street, is mechanical engineer.

Yosemite Portland Cement Co., Merced,
Cal., plans rebuilding part of mill recently

heated combination sterilizers (Schedule
6571) for Mare Island Navy Yard.

Sebastopol Apple Growers' Union, Se-
bastopol, Cal., E. C. Merritt, general man-
ager, plans new refrigerating terminal,
storage and distributing plant. Cost about
\$55,000 with conveying, loading and other
mechanical-handling equipment.

Coca Cola Co., Modesto, Cal., plans new
one and two-story mechanical bottling
plant, 40 x 120 ft. Cost about \$50,000 with
equipment. G. N. Hilburn, 1218 I Street,
is architect.

Newport Consolidated School District,
Newport, Wash., plans manual training
department in new three-story high school,
for which bids are being asked on general
contract. Cost over \$100,000. Whitehouse
& Price, Hutton Building, Spokane, Wash.,
are architects.

Standard Oil Co., Financial Center
Building, San Francisco, will carry out
an expansion program at oil refinery at
Richmond, Cal., for production of a new
motor fuel, recently perfected, under poly-
merization process, including installation
of considerable new equipment. Cost over
\$500,000. Plans have also been completed
for new electric generating station at same
plant, to cost close to \$1,000,000 with ma-
chinery. Stone & Webster Engineering
Corpn., 49 Federal Street, Boston, Mass.,
is consulting engineer for last noted
project.

Scrap Exports Rise At Boston

BOSTON, Dec. 3.—Scrap loading
operations at the Army base
have been interrupted by congestion.
With two steamers loading
close to 11,000 tons, part for Italy,
part for Japan, with another at
Mystic Docks taking 1200 tons to
be supplemented later by a sizable
tonnage at Army base, and with
six additional boats chartered to
load scrap here, the export market
is more active than at any stage of
the current foreign movement. Ex-
porters say they will ship 30,000
tons this month in addition to the
11,000 tons aforementioned. Prov-
idence, R. I., exporters are stocked
for one boat and are stocking for a
second. When they will obtain
steamers is problematical. Heavy
scrap offerings of the Pennsylvania
Railroad have largely eliminated
local brokers from the Pittsburgh
market. Skeleton for Weirton de-
livery has advanced. Unprepared
scrap tonnages for Bethlehem de-
livery are being placed in northern
New England States at \$5 a ton,
f.o.b. The American Steel & Wire
Co., Worcester, Mass., has not
changed its scrap price offers, and
is taking in little stock. Moderate
tonnages of textile cast were placed
the past week by New England con-
sumers at \$9.75 to \$10 a ton, de-
livered.

Pig iron is rather quiet so far as
new business is concerned. Fur-
naces, however, are making good
deliveries against old contracts.

New England by-product coke
makers announce no change in the
December contract price.



EVERYWHERE CRAFTSMEN SPEAK TO ONE ANOTHER ABOUT THESE GOOD TOOLS

THE GREATEST ASSET OF MODERN BUSINESS IS THE GOOD WILL OF THE MILLIONS WHO ARE ITS MARKET. GREATER STILL IS THE VALUE OF SUCH GOOD WILL WHEN IT REPRESENTS THE GROWTH OF GENERATIONS. * * THE MANUFACTURE OF "CLEVELAND" TWIST DRILLS AND REAMERS WAS BEGUN IN 1876 AND ALWAYS GOOD CRAFTSMEN HAVE SPOKEN TO ONE ANOTHER OF THESE WORTHY "CLEVELAND" TOOLS. BECAUSE, LIKE THE TIMES AND THE PROCESSES, THEY HAVE BEEN KEPT UP-TO-DATE, READY FOR THE NEXT FORWARD STEP IN INDUSTRIAL DEVELOPMENT.

* * * ALWAYS LOOK FOR THIS  SYMBOL. IT IS TREMENDOUSLY IMPORTANT TO CRAFTSMEN WHO STRIVE FOR PERFECTION IN RESULTS.

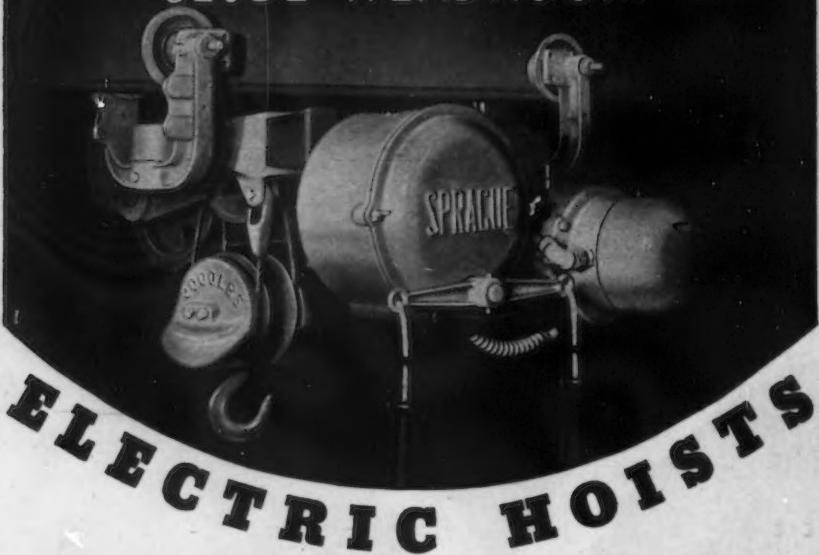
THE CLEVELAND TWIST DRILL COMPANY

Cleveland, Ohio, U. S. A.

STOCKROOMS IN NEW YORK, CHICAGO, SAN FRANCISCO AND DETROIT

"Cleveland" Distributors everywhere are ready to serve you

SPRAGUE CLOSE HEADROOM



ELECTRIC HOISTS

- Features: 1. Absolute minimum of headroom consistent with safe, durable construction. 2. Direct worm drive. 3. Few moving parts. 4. Totally enclosed. 5. Automatic lubrication. 6. Noiseless operation. 7. Rope or push button control. 8. Anti-friction bearings. 9. Ball bearing trolleys with swivel yokes permit hoist to negotiate curves of small radius. 10. Hoist frame supported by trolley yokes and not suspended from king pin.

Sprague Hoist Division: SHEPARD NILES CRANE & HOIST CORP.
356 South Schuyler Avenue, Montour Falls, N. Y.

Arc Welding Costs Reduced

(CONTINUED FROM PAGE 39)

1, this new set gives lower short circuit currents, its use should result in less electrode holder burning.

The greater usefulness of this new set is a result not only of the improved arc characteristics; it is also due to the greater range of electrode sizes that may be used with it, and also to the fact that this set will give satisfactory results when located much farther from the work than would be possible with ordinary sets.

This new welder has noteworthy capacity for giving successful welding results when using a very wide range of electrode sizes, and thickness of materials being welded. For example, the 400-amp. size has been used successfully with 1/16-in. diameter electrodes as well as with 3/8-in. electrodes. This covers the entire range of sizes of commercial electrodes.

It often is desirable, and sometimes very necessary, to have the welding set a considerable distance

from the work being welded. The voltage drop resulting in the cables is a limitation on the distance the set can be removed. The steeper volt-ampere curve of the new Flex-Arc set provides an added reserve of voltage that can be used in voltage drop in the cables. This can be more readily seen by studying the curves of Fig. 1. Both generators are adjusted for the same condition, rated load at 40 volts. If it is desired to maintain an arc voltage of 40 volts but allow a decrease in the welding current to 80 per cent of rated current, it can be seen that the ordinary generator would deliver only 48 volts at 80 per cent load, so allowing 8 volts for drop in the cables. If the load on the new FlexArc generator is reduced to 80 per cent of rated, the generator's voltage becomes 68, which provides 28 volts for drop in the cables. Consequently, this new set could, under these conditions, be moved more than three times farther from the work than could the ordinary set, and still deliver

to the arc the same voltage and current.

The new welding set is more convenient to use. This is due to use of simplified current control procedure, the current "Preset" used, and to light weight.

The usual practice in controlling current setting on American sets has been through adjustment of a shunt field rheostat plus adjustment of the series field strength. A double adjustment is required, and, depending on the adjustments made, various characteristics can be obtained for a given current setting.

The single adjustomatic current control requires one adjustment only to obtain a given welding current, and making this one adjustment automatically gives the best welding characteristic for that current. This simplification of control makes the new set more convenient to use, as well as improving the average welding characteristics.

The current "Preset" of the new set shows on a dial the welding current that will be obtained for any setting of the current controller. This improvement is a material convenience to the welder, at all times, and most particularly where the welding generator is not close to the work.

Because of the elimination of a large number of parts, this set is very light in weight.

The improvement in the character of the arc produced by this new set, and the resultant reduction of spatter results, in two ways, in improvement in quality of weld. This improvement in characteristics results in sounder, less porous welds. Experience shows that an arc which produces a great deal of spatter also produces porous welds. The greater ease of controlling the arc makes the welding more definitely under the control of the operator, and as a result there is a finer control of the welding process, so giving better welds.

The new welding set has advantages with respect to safety. The welding operator may touch the electrode holder when the generator is running and excited. He is also usually touching ground. If an arc is being maintained, he is subject only to the voltage drop of the arc, which is normally low. If an arc is not being held the voltage will be the no-load voltage of the set, which is higher than the arc voltage.

The no-load voltage of the new set is much lower than that of the conventional set, as can be seen from Fig. 1. Its use, therefore, assures greater safety to the operator.

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A PICKLING TANK... LONG ENOUGH TO HOLD SWIMMING MEETS!

Wood tank equipped with Monel Metal tie-rods designed for use in a continuous pickler for strip steel at the plant of a large mid-western steel company. This tank, fabricated by the CHALLENGE COMPANY, BATAVIA, ILLINOIS, is 75 ft. long by 6 ft. wide by 2½ ft. deep. 6,000 pounds of 1¼" hot rolled Monel Metal tie-rods exclusive of hundreds of Monel Metal nuts and washers were used to assure a lasting construction that protects the life of the timbers.



News Flashes

Hollow Taper Pins Save Time in Sheet Pickling

Hollow taper pins of seamless Monel Metal tubing swaged down at the ends and closed by welding, for separating sheets on crates during pickling operations, are a recent development in sheet pickling. Handling large sheets where solid pins are heavy, hollow pins are especially advantageous. Saving in weight is very important where many pins have continually to be placed in position and removed by hand.

World's Longest Bridge Uses Nickel Steels

The San Francisco-Oakland Bay Bridge, length 7½ miles, consists of a cantilever section and a suspension section, the latter divided into two 2300-ft. spans. Nickel Steels are used in both of these sections for highly stressed members. Experience shows that the mechanical properties of Nickel Steels vary less from heat to heat than those of other alloy steels and that their long and reliable service more than compensates for the premium over ordinary steels.

Three Years' Life vs. Two Months'
In January, 1932, the operators of a shell dredge in the lower Mississippi River installed a woven wire screen of "Manganal," a modification of the Hadfield austenitic manganese steel, containing 0.60/0.90% carbon, 11 to 13% manganese, and 2 to 4% nickel.

Previously-used screen wire had lasted about 60 days before being replaced. But the nickel-manganese steel screen performed continuously for almost three years—an increased service life of 1700 %!

Automotive Parts

The widespread use of Nickel Alloy Steels for highly stressed automotive parts testifies to the toughness and dependability of these Nickel Steels. They not only reduce breakage and wear under ordinary service conditions, but successfully meet emergency demands of abnormal road conditions.

Monel Metal for Ammonium Sulphate Centrifugal Extractors

Baskets and shells used in centrifugal extractors handling ammonium sulphate in coke by-product plants have to be both strong and corrosion-resistant. Made of Monel Metal, these baskets readily absorb the high stresses developed by centrifugals and give long service in the face of the corrosive and abrasive materials handled.

TIGHTNESS assured for years to come with

3 tons of tie-rods made of

MONEL METAL

kept tight saves expense of acid lost through leakage.

An additional advantage of Monel Metal tie-rods is their freedom from "dezincification" and "dealuminification," those peculiar forms of corrosion that take place in alloy tie-rods containing zinc or aluminum.

Monel Metal tie-rods are so long-lived that frequently they outlast the tank, and are used over again, either in a new tank or are made into pickle-pins or eye-bars.

Write for free copy of "Equipment Designs for the Pickle House," addressing

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street
New York, N. Y.

Monel Metal is a registered trade-mark applied to an alloy containing approximately two-thirds Nickel and one-third copper. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.



Naturally, a tank that can be



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Before shipment from our Darby, Pa., factory, may we quote on your requirements?

G. WOOLFORD WOOD TANK MFG. CO.
Paschal P. O. Philadelphia, Pa.

New Pioneers on a New Frontier

(CONTINUED FROM PAGE 21)

exchange in the markets of the world.

We are favored as well in the character of our population. Drawn from a diversity of races, they bring to our land every useful type of acquired skill and native ability that could be asked for; and their energies are heightened by climates that are for the most part particularly favorable for effective work of hand or mind.

Finally, years of experience have produced in this country a body of business and technical experience directly adapted to the production and distribution on a large scale, at low cost and with minimum human effort, of a rich variety of desirable goods and services.

The rising standard of living is physically possible. Quite obviously, when we consider the matter, this new social frontier of the higher standard of living offers the same advantages as did the old physical frontier, if we can but enter into and occupy it.

We seek more and better goods and services at less relative cost. This can only be effected to the desired degree by both expansion and refinement of our productive machinery and processes. The expansion of industry will call for more and more workers. The needed expansion and improvement of production will call for more and more investment. Only

by this expansion of operations and revival of investment can we simultaneously produce more and better goods and services, distribute them more widely, do so at less relative cost, and employ more men in the process at a number of working hours per week which tends to decrease rather than increase. All other programs fall short of this complete solution.

The New Frontier

Our progress toward a higher standard will thus definitely provide the opportunities for men and for money that were furnished by the old frontier; and as this fact becomes obvious, it is plain that our old psychology of firmly based optimism will revive, and our newly injected defeatism will wither and disappear—a consumption devoutly to be wished for.

If this new social frontier is physically attainable, and offers a continuation of the services which were rendered to us for so many generations by the old frontiers, we must be in earnest in our determination to discover and surmount the obstacles which deter us from entering into it.

We have made good progress towards an ever-rising standard of living in the past, but in recent years our forward movement has been checked, and we have even been forced backward from our goal. The causes of our trouble have not been single, but many.

But, of the many, two are of such overshadowing importance that it is folly to disturb ourselves about the minor difficulties until we have found means of surmounting these major ones. In fact, we cannot even see the other problems clearly until these two have been solved. Thus attacked, the whole problem will more readily yield to solution.

Restricting Idea Hampers Our Progress

The first obstacle is a false idea, and it is the more dangerous from being held by a great majority of the population of the country. Business, labor and agriculture account for almost the whole body of persons engaged in providing a high standard of living, and all three of these groups are imbued with this false idea and strive to make it effective. That false idea is that the best interests of each separate group are best served by control or restriction of output and by maintenance or raising of prices.

Industry has long been fascinated by the possibilities of understandings between competitors which lead directly or indirectly to price and production control. So evidently profitable does this appear that the movement toward agreement and combination has been almost irresistible. As early as 1890 Congress recognized the rapid growth of the movement and passed the Sherman anti-trust act forbidding "conspiracies in restraint of trade." But in spite of that legislation and of the succeeding Clayton act and the establishment of the Federal Trade Commission, business has openly



Drawn for Revere Copper and Brass Incorporated by Edward P. Coase

Call to Meeting

One of Paul Revere's first copper and brass assignments was to recast the bell for the Old North Church, the church where the warning lanterns in the belfry started Revere on his memorable ride to Lexington. When the bell was finished, its tone was so wonderfully clear and true that similar orders came thick and fast. In all, 396 bells were cast for various New England churches; seventy-five of these are known to be still in use. But Revere bells, brass cannon, copper spikes and rivets were soon supplemented by a still greater achievement.

In 1801, Revere mastered the secret for rolling copper, a process never before accomplished in America. Copper sheets from his new mill soon protected the hull of the famous frigate "Old Ironsides," the roof of the Boston

State House, and many other public and private buildings up and down the coast.

Paul Revere's ability as a copper and brass manufacturer, inventor, and industrialist is still serving America. Through succeeding generations, the original firm of Paul Revere & Son has grown and consolidated to the present nationwide organization of Revere Copper and Brass Incorporated.

The Revere heritage of leadership in discovering new applications for copper and brass has also been continued. If you have a problem for which copper or one of its alloys might prove the answer, we invite you to consult with our Technical Advisory Service.

For complete technical data on any of our copper products, address our Executive Offices.



We are happy to take this opportunity to wish you a very
Merry Christmas and a Bright and Prosperous New Year.

Revere Copper and Brass



INCORPORATED

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NEW BEDFORD, MASS. · ROME, N. Y. · DETROIT, MICH. · CHICAGO, ILL. · SALES OFFICES IN PRINCIPAL CITIES

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of PERFORMANCE

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ABBOTT BEARING BALLS

or secretly, consciously or unconsciously, moved in that direction. Some industries have, indeed, been so "successful" in coming to agreements that they have encouraged outside competition and quite evidently defeated their purposes.

Labor Policies Have Coincided With Business Policies

Labor union policy has been identical with business policy. But since the commodity dealt in is labor and skill, the fallacy is expressed in somewhat different terms. Labor union policy seeks "shorter hours and higher wages" without any expressed or discernible limit. And some unions, like some businesses, have been so "successful" in this policy that their members are idle for months and years, when other workers are profitably employed.

Agriculture has long looked with envy on the "success" of business and labor in carrying out this false idea, and at long last it too has its chance, under the AAA to limit production and raise prices; and it too is meeting with the "success" of lost foreign markets, stimulated foreign competition, and actual importation of products which our farmers are well able to supply.

When business, labor and agriculture hold the same beliefs, be they true or false, we must not be too surprised if the administration hastens to embody those beliefs in the law of the land. This was done, and as a result we had AAA and NRA. But legislation cannot purge a fallacy of its folly.

AAA + NRA = Lower Living Standard

These two institutions together lead to a universal condition of less goods at higher prices. But our goal of a higher standard of living requires more and more goods at relatively less prices. The governmental policy is surely false. It leads away from our goal. There is no magic algebra which can prove the truth of the equation AAA + NRA = prosperity. It does not equal prosperity. It equals a lowered scale of living for the people of this country, and no other answer to this equation can be found.

This first obstacle, then, is in the nature of a drag or brake or a heavy load to be carried. The second has more the nature of a recurring catastrophe which, when it occurs, not merely retards our advance, but stops it completely. It not merely stops it, but throws

us backward and destroys the very mechanism of progress, so that we must spend weary months and years in repairing it before we can regain our lost ground and resume our advance.

This second obstacle is the periodic onslaught of speculative frenzy to which our social organization is subjected.

We should clearly understand what we mean by "Speculative." In the sense in which we are using the word it has no connection with business enterprise or business risk. A man may risk his time and all the funds at his command in the development of a new machine or a new product, or simply in an attractive business opportunity of the conventional sort. The outcome may be doubtful and may be called "speculative." But the proceeding is essentially healthy if pursued with judgment and in the light of experience. On the willingness of the business community to engage in such risks are based our hopes for expanding employment and a rising living standard. Speculation is quite another thing and is most unhealthy when carried out on a large scale. It will best be understood if we describe the conditions under which it flourishes.

Periodically, business men become discouraged with the slow and meagre profits of normal business, which is the business of producing and distributing goods and services. Normal business profits are small. If on the one hand we admire the returns from certain well-managed or especially fortunate organizations, on the other we observe the thousands of businesses which struggle along for years without profit, finally sinking into bankruptcy with losses which run to hundreds of millions in the aggregate. Between the two extremes lies the general average of business success which, with infinite work and worry, returns to its owners little more than the normal interest on the capital invested.

Capitalizing Futures

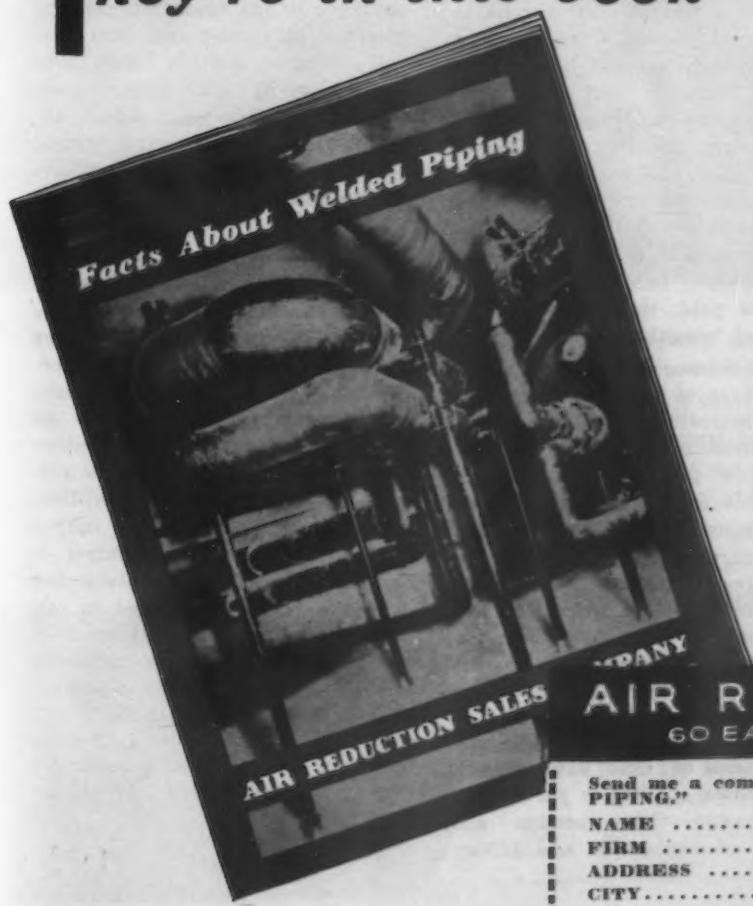
From time to time the business world, discouraged with this meagre return, looks about and discovers lying ready at hand a marvelous mechanism which promises to work to a most attractive end. Instead of finding in his hands at the end of the year only the small profits of this year's

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AIRCOWELDING—on job after job—has made good to piping contractors its promise of speed and economy since its introduction several years ago. It cuts pipe welding time in half and saves from 30 to 50% in rod and gases—producing welds that are superior in physical properties to those made by the former comparatively slow and costly processes.

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FLEXIBLE WIRE CONVEYOR BELT QUESTIONNAIRE

Dear User and the _____
Address _____ and the _____
Location _____

INSTALLATION PROPS.
Distance between centers of main pulleys
Allowable shear stress per foot of belt
Distance of driving and driven pulleys
If supporting rollers or idlers are used
Distance between centers of main pulleys
Allowable shear stress per foot of belt
Distance of driving and driven pulleys
If supporting rollers or idlers are used
Distance between centers of main pulleys
Allowable shear stress per foot of belt
Distance of driving and driven pulleys
Allowable tension to make belt run straight
Width of belt
Belt speed
If an incline or other angle
Speed of pulleys

BELT PROPS.
Kind of material to be conveyed or conditioned
Percent of moisture content
Maximum and minimum temperatures
Chemical characteristics of material
What metal parts in contact
Weight per cu. ft.
Speed of belt

ADDITIONAL REMARKS.
Wearers or drivers etc.

U. S. Patent 1,952,873

business, this mechanism promises that the business man can hold in his hands to use or spend and enjoy now, not only the profits of this year, but next year's profits as well—the profits of five years ahead—the imagined profits of future generations. This mechanism, ready at hand for such delectable use, is the speculative market for securities, real estate and commodities, with the financial mechanism to which it is geared. The endeavor to realize far future profits by the use of this mechanism is "speculation" in the sense in which we are using the term.

When the professional speculators are joined by thousands of business men, and finally by the general public in the operation of this mechanism, it does seem to work. For many months or for a term of years we do find new, spendable wealth in our hands—new millions, new billions. Apparently we can reach far into the future, seize its profits and enjoy them now.

Fictitious Wealth

But it is in appearance only. There is no mechanism which will reach into the future and seize the profits of years not yet born. The reality is ugly and sordid. If

there are new billions of "wealth," those billions came directly from bank borrowing by purchasers of the securities, real estate or commodities, to finance their purchases above cash margins which were comparatively narrow. Bank credit money, from its very nature, is generated by the process of borrowing, and disappears when the debt is paid. In consequence, for every billion of new wealth there is somewhere a billion of new indebtedness, and if that billion of indebtedness becomes due and must be paid, then somewhere a billion of "wealth" must disappear.

That volume of indebtedness—that source of fallacious wealth—is an incredibly flimsy and fantastic structure when we reach the end of a protracted speculative boom. It finally becomes evident to everyone that the future profits on which present prices are based can never be realized. When that does become evident, prices fall and debts become due. And then, for long months and years every cent of savings, every mite that can be spared from the bare expenses of existence, must be devoted to the liquidation of that indebtedness. These sums are lost to purchasing power, and these months are months of destruction and defeat.

The damage must be painfully repaired before we can again resume our progress toward the new social frontier, the raised standard of living.

These two obstacles, the false idea and the destructive calamity, are not light matters. We have struggled with them for generations, and they have grown stronger with the years. What hope is there that we will ever control or overcome them?

Prospect Is Bright

I am glad to stand before you tonight and to say that to me the prospect for sanity and intelligence in these matters looks brighter than at any time in the past. We have done much thinking. Experience has brought to us bitter lessons. Some of them we have learned.

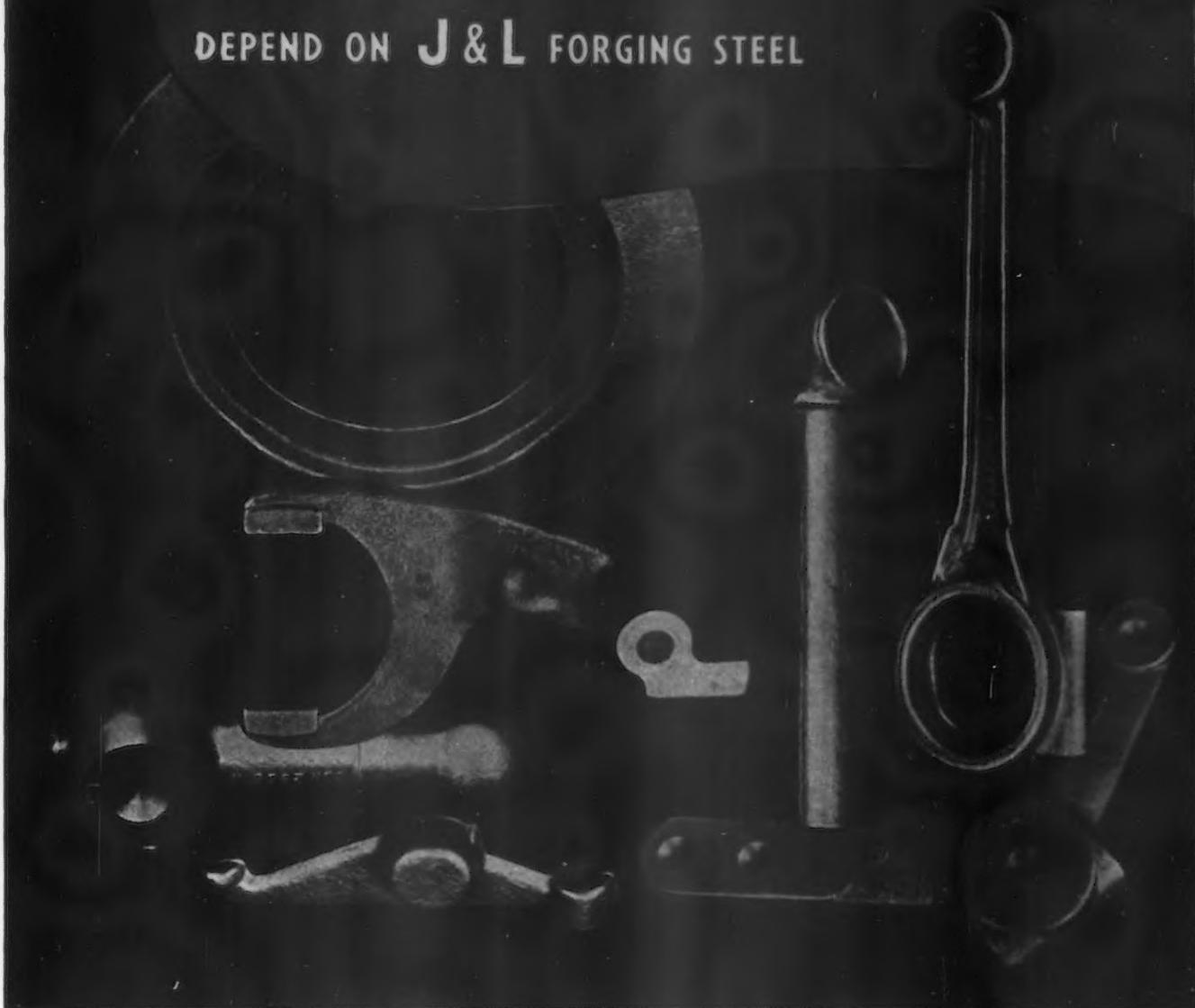
We have, for instance, one example before our eyes of an industry which has never for a moment worshipped the false gods of production control and raised prices. The automotive industry has always been willing to submit to severe competition, and in consequence it has year by year built more and more and better and better cars and sold them for lower and lower prices. In further consequence it has made the greatest increase in employment and payroll dollars and is the most prosperous of any of our great industries. It has made the greatest contribution to industrial recovery. Other industries are taking notice and considering their ways.

Furthermore, there is a growing realization that if industries agree on price and production instead of competing, they open the door to government regulation. Indeed, under those conditions, government control becomes an inescapable duty. On the other hand, for an industry which submits to the hazards of competition, and governs its prices and output thereby, governmental control is an unwarranted impertinence and a social calamity. Viewed in this light, our anti-trust legislation is the strongest protection available to business. These things are becoming clear, and if there is any drift of business opinion it is away from the fallacious search for safety, and toward intelligent courage.

Industry must lead the way.

FOR WORKING PARTS THAT DARE NOT FAIL

DEPEND ON J & L FORGING STEEL



Jones & Laughlin supplies forging steel for many vital automotive parts where dependable quality is of first importance. Illustrated here are a number of such forgings which are parts for today's motor cars.

The increasing use of J & L forging steel for automotive parts is due to its uniform and dependable high quality. Every bar of J & L forging steel is manufactured to exacting specifications. Every process of manufacture is under strict metallurgical control. Constant tests and inspections insure not only uniformity of quality in forging steel bars, but also straightness, accuracy of cross section, and excellent surface characteristics.

For forged working parts—and for all other forging jobs—look to J & L forging steel.

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**ROTATING SPINDLES BECOME
GOOD THREADERS WITH
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Murchey manufactures Collapsible Taps, Self Opening Die Heads, Bolt Threading and Pipe Threading Machinery

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We cannot expect labor or agriculture to do so. The prosperity which will come to industry as a whole in so doing will so directly increase the demand for labor and for agricultural products that the artificial methods hitherto applied by these two groups will be clearly seen as the hopeless proceedings which in reality they are.

Tools of Control

As to the control of speculative frenzy, we can point to much more definite items of achievement. Beginning with the Glass-Steagall Act of the last months of President Hoover's administration, and ending with certain useful elements of the banking act passed last summer, we have provisions which by no means insure us against a recurrence of this calamity, but which do provide us with tools which, if wisely used, will greatly diminish the severity of any future attack.

Hitherto it has not been possible to restrain the expansion of speculative credit without throttling the flow of credit for normal business in the process. Now, for the first time, we can restrain the evil while supporting the good. We need have no repetition of the period from 1926 to 1929 with its

disastrous consequences. We can, if we will, prepare a future freed of the worst follies of the past, in which we can move steadily and purposefully toward our social objective of a raised standard of living for our people as a whole.

It must be clear to all that engineers has a particular interest and responsibility in these matters. We cannot sit idly by and see the choice made for us.

If, faced with the disappearance of the physical frontier, we bravely resign ourselves to accepting that fact as final, and key our national policy and our national hopes down to that dismal decision, there will be little future for the engineer. There will be fewer of us, and our services will be of a subordinate order.

Opportunity for Engineers

If, on the contrary, we make the more courageous decision to replace the lost physical frontier with the new social frontier of the raised standard of living, then the engineer will come into his own.

For the raised standard of living demands more goods and services of better quality and at lower cost. This is the service which the engineer is qualified to

render. To this was he born; for this was he educated; this is his life work. In a society dedicated to this end he will find profitable employment, satisfying recognition and useful, essential service of the general good. With the scientist, the inventor and the broad-visioned business executive he will pioneer in the founding of a new order as far surpassing our present one as that does the barbarism of earlier ages.

We are faced with these alternatives—to retreat or to advance. Is there any doubt as to which the American people should choose? Nay, rather, is there any doubt as to which they will choose?

Corrosion After Pickling

(CONTINUED FROM PAGE 33)

ture is that the presence of iron in a galvanizing bath seems to promote the formation of zinc oxide. This is supported by practical experience as a new galvanizing bath takes a much longer time to cloud up and form an oxide film. The new bath remains like a mirror for a much longer time than a bath from which dross has been removed from time to time.

The photograph on the right in Fig. 4 illustrates the results of the test when molten zinc was heated with iron oxide to a temperature of 1565 deg. F. The important facts to be observed are (1) the large mass of dross crystals (the evidence now is absolutely conclusive), (2) the different crystal form of the dross at high temperatures, and (3) the hexagonal forms that can be plainly seen and the striated structure of the crystals.

The series of research investigations just described cover the complete range of galvanizing temperatures and far beyond. The results of all the tests over the complete range may be summarized as follows: (1) Molten zinc and iron oxide react chemically to form galvanizer's dross. The molten zinc acts as a reducing agent, freeing the iron which immediately forms the zinc-iron alloy. The oxygen released also acts chemically on some of the zinc forming zinc oxide. (2) Molten zinc is a powerful reducing agent, or iron oxide at galvanizing temperatures is an oxidizing agent. (3) The introduction of iron in the bath due



THIS MILLING MACHINE, in a large automobile plant, mills the tops of cylinder blocks on a definite schedule. Gulf lubricants help to keep it in continuous, trouble-free operation.



MACHINES LIKE THIS—which is machining crank shafts for the main bearings—give lower unit cost of operation with Gulf lubricants in service.

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BUSY machine shops and metal working plants are placing this one big responsibility on lubricants today: *They expect the lubricant to help them maintain continuous operation and fixed unit costs.*

That is why it pays to have a Gulf engineer survey your equipment carefully and recommend the lubricant which is exactly right for each job. The cost of oil and grease for a machine may be a small item, but a delay of only a few minutes—due to faulty lubrication—may play havoc with your operating schedules and your cost sheet.

In metal working plants from Maine to Texas, Gulf engineers are helping plant operators get more efficient service from their equipment. If you are not using Gulf products, give them a trial. They will help you keep unit costs for operations in your plant at a low figure.

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 IN YOUR PLANT

to the reducing action of the molten zinc increases the hardness of the zinc. This was noticed in sawing the specimens in half in preparing them for the microscope. (4) The action of the molten zinc on the iron oxide is about as follows: (a) The iron oxide turns from a red to a purple color (due to heat and perhaps loss of some water of crystallization). (b) Alloying action starts as the iron oxide is reduced by the action of the molten zinc forming a dilute zinc-iron alloy and freeing the oxygen. (c) With increase of iron content, a granular zinc-iron alloy is formed. (d) With still further increase of iron content, transparent zinc-iron alloy crystals form which later turn to a dark zinc-iron alloy. (e) A segregation of dark zinc-iron alloy into dross crystals takes place. (f) Segregation of the small dross crystals into large dross crystals takes place. (5) There seem to be five different phases to the process, as follows: (a) From the melting point of zinc through 900 deg. F. (b) From 900 to 1100 deg. F. (c) From 1100 to 1300 deg. F. (d) From 1300 to 1500 deg. F. (e) Above 1500 deg. F. (6) The reducing action of the zinc becomes rapid at between 900 and 950 deg. F. (7) The reducing

action of the zinc at 1100 deg. F. becomes very violent and once started may be compared to a thermit action, generating great heat and light. This is probably due to the burning of the zinc to zinc oxide by the oxygen freed from the iron oxide. (8) The dross crystals reach their maximum size at 1100 deg. F. (9) Some of these dross crystals show remarkable properties in regard to light. (10) At 1300 deg. F. the zinc oxidizes rapidly. (11) At 1565 deg. F. complete, separate and distinct dross crystals were formed, and obtained separately. (12) An increase of temperature increases the size of the dross crystals. (13) The alloying action at 950 deg. F. decreases the fluidity of the melt when it was stirred, and the zinc very quickly became thick and pasty. (14) The reducing action of molten zinc on iron oxides begins at the melting point of zinc and increases in intensity as the temperature is raised. At 1100 deg. it becomes so active that the burning of the zinc by the oxygen liberated produced an intense light.

The next important step in the research investigation was to make a chemical analysis of each of the melts at the different temperatures

to discover how much iron had been reduced by the molten zinc at that temperature. The results showed that at 800 deg. F. there was 0.99 per cent iron in the melt, at 850 deg. there was 3.03 per cent, at 900 deg. there was 3.70 per cent, at 950 deg. there was 4.75 per cent, and at the temperatures at which dross crystals form rapidly there was 8.94 per cent iron in the melt.

It is a very interesting and practical thing to note that the iron content of the melt at 900 deg. F. was 3.70 per cent. The chemical analyses of hundreds of practical dross samples obtained from galvanizing baths operated at temperatures under 900 deg. F., or from 875 to 900 deg. F., all show an iron content around 3.75 per cent. Thus the theoretical research investigations check up very closely with the results obtained under ordinary practical galvanizing conditions.

A complete summary of the investigations of the action of molten zinc upon iron oxide gives the following results:

(1) Galvanizer's dross is produced as a direct result of the action of molten zinc at galvanizing temperatures on the iron oxides formed as corrosion products after pickling and during drying.

(2) The higher the bath temperature is, the more powerful and active is the reducing qualities of the molten zinc.

(3) The higher the galvanizing bath temperature, the faster the iron is reduced from the iron oxides to form dross.

(4) Iron sulphates, iron chlorides, and soft yellow iron oxides are easily reduced by the galvanizing bath. The quantity of dross produced is therefore a function of the surface area corroded.

(5) The iron content of the zinc-iron alloy formed by the reducing action of molten zinc upon iron oxides due to corrosion is higher with higher temperatures of the galvanizing bath.

(6) The practical application of the results of this investigation is to see that there are no iron oxides or corrosion products, pickling salts, or other material containing iron on the surface of the product when it enters the galvanizing bath. This fact can be accomplished by thorough washing after pickling, and by the proper fluxing and drying methods.



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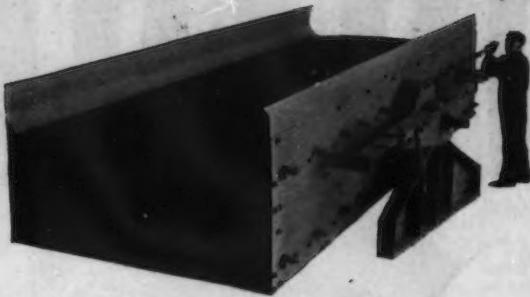
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Comprehensive Line of Oil and Grease Forced-Feed Lubricators

(CONTINUED FROM PAGE 37)

by turning the adjusting screws mounted on a plate on the cylindrical upper part of the lubricator body.

Recent applications of this type of Bosch oil lubricator include an automatic chucking machine, equipped with two lubricators, one of which is located on the moving tailstock, thus facilitating feeding of lubricating points constantly changing their location. The same type lubricator is employed on a high-speed punch press to supply oil to 38 bearings and guides.

Grease Lubricator Uses Same Pumping Mechanism

The type K automatic positive force-feed grease lubricator is a self-contained unit for steel plant, coke and gas plant, foundry, saw mills, cement mill and similar machinery. It also features consistent rate of flow, with close regulation of quantity of lubricant.

It consists of a cylindrical tank which serves as a container for the grease, a scoop, and a helical disk feeder and a box-shaped cast



AUTOMATIC forced-feed lubricators of this type are designed for application to steel mill, coke plant, foundry and similar equipment.

iron base which houses the entire pump system with its drive mechanism. The pumping mechanism is identical with that of the forced-feed oil lubricator types "T." Working parts are entirely enclosed and are self-lubricated.

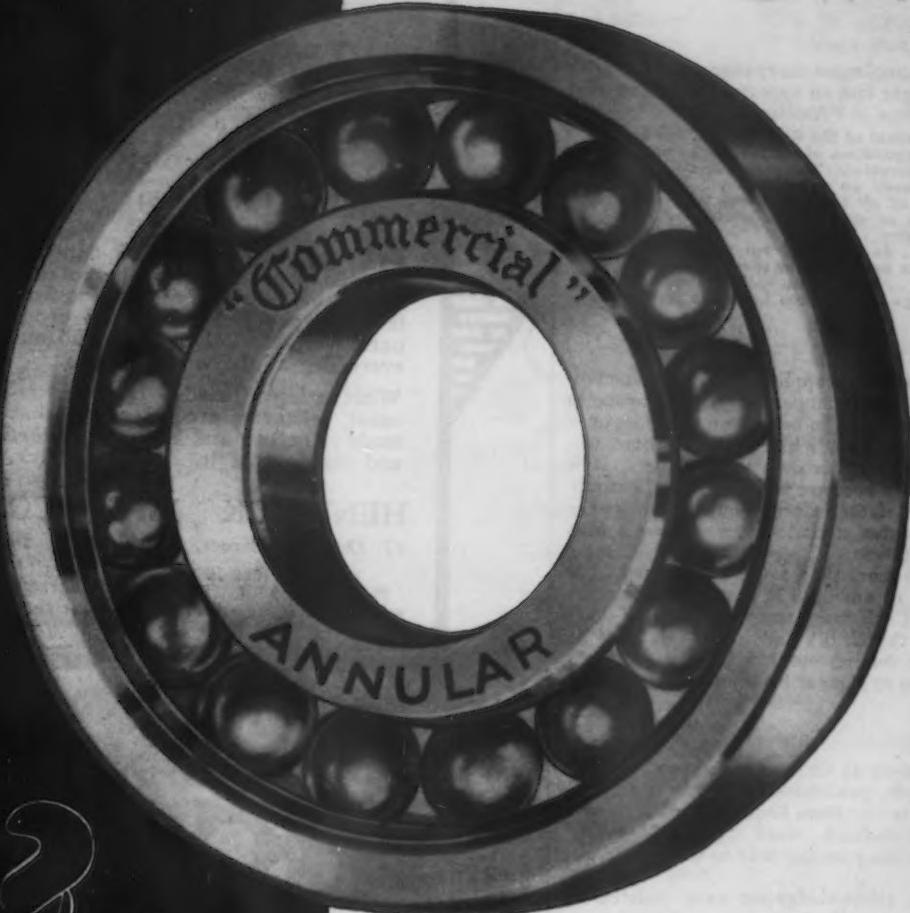
The lubricator drive shaft may be driven from any suitable moving part of the machine on which the device is used. The slowly rotating feeding mechanism pushes the grease contained in the tank through a strainer and presses it into the inlet opening of the pump unit, which presses it, in turn, through the feed tubing to the lubricating points. The grease guide-plunger acts as the distributor for the grease, allowing it to pass to one and then to the other of the two outlets of the pump unit. Feed rate is adjustable.

Recent installations of these grease lubricators include two for automatic forced-feed lubrication of nine steel rolling mills. Lubrication starts and stops when the mill starts and stops. A rolling mill pinion stand with 16-in. diameter by 24-in. long bearings is another application. Each feed point is fed by two outlets leading to one common feed pipe. An automatic threading machine with a type K lubricator that supplies lubricant to six different points is among other applications.





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ALL TYPES OF INSTALLATION-MADE TO YOUR OWN SPECIFICATIONS**



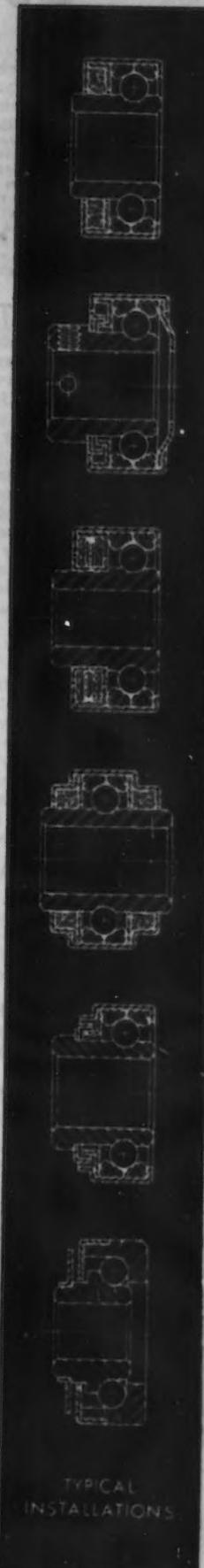
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TYPICAL
INSTALLATIONS

JUST BETWEEN US TWO

Sock-Filler

If you have a friend whose complacent occupancy of a comfortable rut dismays you, you might find an opportunity to show him tactfully what J. C. Aspley writes in "American Business":

"This jungle rule—the survival of the fittest—applies to every one in business, regardless of his job, for business is essentially a battle for survival. There can be no place for the man who lets himself go to seed. . . That is nature's law, and in spite of all human efforts to change it, it will probably remain so long as the world endures. It is a condition, not a theory.

"What can you and I do to keep from going stale? . . . the easiest way of all to keep on your toes and to keep forging ahead is to read. . . There is no valid reason why any business man should go stale unless he is too lazy to read."

Nothing But Shop Talk

THE man who reads nothing but what applies to his own line will probably end up rich enough to pay 80 per cent of his income to the Government, but you wouldn't care to be cast up with him on a desert island, and his wife probably finds him pretty tiresome, too.

But certainly a man should read his own trade paper. If it didn't sound like blowing our own horn we would say that, entirely apart from the intrinsic value of the information a trade paper gives a man about his own business, a trade paper endows a man with God-given discontentment.

So if your static friend rates more than a Christmas card from you, you can rekindle the fires of ambition in him by sending him *The Iron Age* for a year as a Christmas present.

Six dollars is the price (in the U. S.) and if the first issue he receives—the Annual Number coming out Jan. 2—does not rock him on his heels and cause him to shower blessings on your head, you can sue us.

Elegant

THIS idea of giving subscriptions as Christmas presents is highly recommended by, of all people, publishers. Among the enthusiastic letters we have received is one from Esquire containing two superlatives of that worked-to-death word "grand." "What grander gift . . ."—"Isn't this the *grandest* way to solve your gift problem, etc." Gracious!

They are giving away an acknowledgment card painted by Rockwell Kent. If you insist, we will throw in one done by our artist, Al Drab, who is neither so well-known nor so expensive.

Without Blinking An Eye

THE king-princess-page-chain problem given here on Nov. 21 was done by the mighty minds between yawns. But everyone sent the chain down w-h-o-o-s-h!—balanced only by an empty or dumped it out the window. We have asked the Clevelander who sent in the problem to enter an objection if the problem can be solved otherwise.

R. W. Orth of GE called the other day. He gave us a problem which was given him by Guy Bartlett, also of GE. If it dawns on you in five minutes your offspring probably has little trouble with his homework.

Three ancient Greeks meet. One is a Cretan who never tells the truth; the other two are Athenians, who never tell lies. Labeling them indiscriminately A, B, and C, the following takes place:
A says something to B which C does not hear. C asks B what A said, and B replies: "A told me that he is a Cretan." Which is the Cretan—A, B or C?

What A Tackle!

A 21-GUN salute to the photographer who took and the advertising man who selected that picture New Departure used on the front cover of the Nov. 28 Iron Age. We have never seen more action crowded into a single photograph.

They Said, "No"

WE are trammelled. Dr. Gillett of the Battelle Memorial Institute called our attention to a humorous and harmless error made in a recent advertisement. We made a little item of it, stating that we hoped the advertiser wouldn't mind if we broadcast the mistake.

Just to pass the buck in the event of a squawk, we asked the Advertising Dept. if the item was O.K. "No," they said. "Why?" we asked. "Just a whim of ours," they said.

At that point our pride asserted itself and we quit arguing, for the Advertising Dept., like the wife in Oliver Herford's story, has a whim of iron.

—A.H.D.

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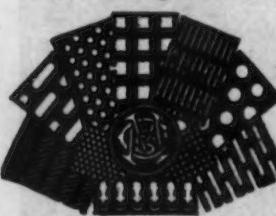
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